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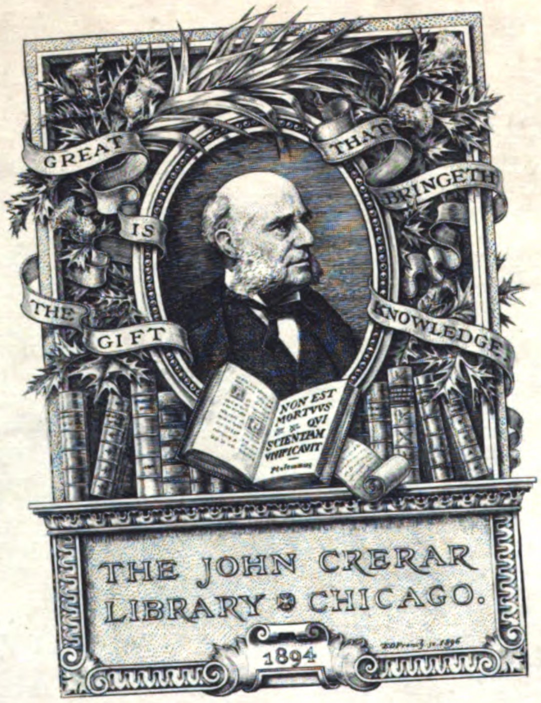
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TELEPHONIC TESTING—ARTICLE II

By Kempster B. Miller and William W. Dean.

So many tests involved in telephony require the measurement of electrical quantities that attention must be given to the methods and apparatus therefor. Excellent treatises on electrical measurements exist, and the only excuse for dealing with the subject here is to give completeness to this work. The more general works on electrical measurements often fail to indicate methods that are particularly applicable to telephony, and it is thought advisable to outline the principles and practice pertaining to "Telephone Testing."

The most important instrument in every field of electrical measurement is the galvanometer in some of its numerous forms.

Galvanometers are of two general types: First, those in which a magnetic needle is freely suspended within the magnetic influence of a coil of wire through which the current to be measured flows; second, those in which a coil of wire carrying the current to be measured, is movably mounted within a powerful magnetic field.

The principle upon which galvanometers of the first type operate is that a magnetic needle freely suspended tends to assume a certain position, owing to the field of force of the earth or some nearby magnet. When currents are sent through the coil in which the needle is suspended, it is moved from its normal position, tending to place itself at right angles to the plane of the coil. The amount of this movement or deflection is a measure of the current strength.

Of this type, the ordinary galvanoscope or current detector is the simplest, although it cannot properly be termed a galvanometer, as it is generally used for *detecting* the presence of a current rather than for *measuring* it.

The Thompson galvanometer represents the highest development in this same class and is largely employed in making measurements where great accuracy is required. The needle is usually built up of several very short light bar magnets arranged side by side, suspended by a quartz or silk fibre within the coil or coils of the galvanometer, so as to be readily influenced by the magnetic field set up by the current to be measured.

Instead of using a pointer for indicating the degree to which the needle has been deflected, the Thompson galvanometer employs a much more subtle medium, a ray of light. Fastened directly to one side of the composite needle is a small circular mirror, which reflects a beam of light from a stationary source against a horizontal scale mounted at a suitable distance. The relative position of the galvanometer, scale and the source of light is such that when the needle is at rest, the reflected light rests upon the zero of the scale. The slightest deflection of the needle will cause the spot of light to move along the scale, and it is evident that the angular deflection of this ray will be twice the angular movement of the needle.

This method is of great advantage because the ray of light forms an indicator of any desired length; is absolutely inflexible; without weight and consequent inertia; and any deflection is multiplied by two upon the scale, which further increases the facility of noting very small deflections.

There are some disadvantages, however. It is not always convenient to obtain a suitable source of light, especially in field work. Unless the apparatus is used in a room somewhat darkened, the spot is invisible on the scale. Therefore, the deflection of the needle may be observed by a telescope placed at a suitable distance and focused on the mirror, the scale being arranged in such a position as to be reflected by the mirror into the telescope. By this means an observer at the telescope can determine the deflection with the greatest accuracy. To facilitate this the telescope is provided with a vertical cross hair. When this method is used the numbers on the scale should be reversed in order that they may read properly in the telescope.

The D'Arsonval galvanometer represents the practical development of the second class of galvanometers mentioned; those in which the moving element is in the form of a coil of wire adapted to carry the current to be measured, suspended in a powerful magnetic field. In commercial forms the coil is in the form of a rectangle carrying a mirror suspended by a suitable flat phosphor bronze ribbon, between the poles of a very powerful permanent magnet, usually composed of laminations of hardened steel separately magnetized. The current to be measured is passed through the coil, tending to create a deflection for exactly the same reason that the armature of an electric motor revolves when a current is passed through its coils. The method of using the D'Arsonval galvanometer is the same as in the Thompson, and while it is not capable of as delicate work, it has many advantages from a practical standpoint. In the Thompson galvanometer the zero position of the needle is maintained by reason of the earth's, or some weak magnet's field of force, in the same manner as the needle of an ordinary compass. Anything tending to disturb the earth's field of force, such as a bunch of keys carried in the pocket, or a passing street car, causes good work with the Thompson instrument to be difficult unless means are taken to shield the instrument from all external influences. In the D'Arsonval the needle is maintained by the torsion of the suspension ribbon, and as this galvanometer makes use of its own magnetic field, which is extremely powerful, no trouble is experienced from external influences. It is possible to use the D'Arsonval instrument in proximity to the most powerful electro-magnetic machines. For this reason and because its suspension is not so delicate, the D'Arsonval instrument is by far the most convenient for most work and is sufficiently sensitive for telephony.

Voltmeters and ameters, of which the Weston instruments represent the most highly developed type, are really nothing but D'Arsonval galvanometers properly calibrated to read directly in volts or amperes. In the voltmeter the movable coil is connected in series with a high resistance within the case of the instrument. Owing to the high resistance the instrument may be connected between the mains, the difference of potential of which it is desired to measure. The small amount of current which flows, causes a deflection of the pointer, the amount of this deflection depending on the strength of the current. Since the resistance of the voltmeter is constant the current flowing through it will be directly proportional to the voltage between its terminals, and, therefore, the deflections will vary with the voltage. The scale of the voltmeter is, therefore, marked to read directly in volts.

Ammeters, since they are required to carry currents of considerable size, are usually provided with shunts for the coil, these shunts being of such low resistance as to carry a large proportion of the current to be measured. In this case, the divisions on the scale are so arranged that the indication of the needle will be that of the total number of amperes.

Editor's Note.—The first article of this series appeared in the issue of December 6. They will continue for about a year.

For quick work nothing is so convenient as the ammeter and the voltmeter, as they have the advantage of being portable and direct reading.

The reflecting galvanometer must be re-calibrated every time it is used, and at frequent intervals while in use, in order to determine a basis for reading. As the deflection noted may be taken as proportional to the current, it is clear that if a known current will give a certain deflection, double that current will give twice as great a deflection and one-half of the current will give one-half as great. Thus in order to measure an unknown current, it is necessary to first send a known current through the galvanometer and note its deflection. The deflection produced by the unknown current may then be noted and the value of this current calculated from the deflection given by the known current.

While the galvanometer is primarily a *current* measuring instrument, Ohm's law makes it equally applicable to measuring resistances, for we know that with a given electromotive force the current is inversely proportional to the resistance. Therefore, it follows that if, with the voltage of a given source, we obtain a certain deflection, when the total resistance in the circuit is one megohm we will obtain one-half as great a deflection when the resistance is two megohms, and double the deflection when the resistance is one-half megohm. This is strictly true only when the resistance of the galvanometer is taken into consideration as a part of the total resistance of the circuit. When, however, the resistance to be measured is that of the insulation of a line it is usually so high that the resistance of the galvanometer may be neglected without an appreciable error.

On account of the great sensitiveness of the reflecting galvanometer the currents dealt with are frequently great enough to so move the needle as to throw the reflection beyond the limit of the scale. In order to prevent this and in order to deal with small deflections, galvanometer shunts are used. These are resistances bearing a certain known relation to the galvanometer resistance, and placed in parallel with the galvanometer, to take a portion of the current. The use of the shunt is very simple. The galvanometer being unable on account of carrying capacity of its coil and the limited length of the scale, to measure the entire current, measures only a certain portion of it, the other portion being carried by the shunt. Inasmuch as there is a known relation between the resistance of the shunt and that of the galvanometer coil, it is easy to calculate the total current.

Shunts usually have their resistances so proportioned as to be respectively, 1-9, 1-99 and 1-999 of the resistance of the galvanometer coil. Then they carry respectively 9 times, 99 times or 999 times as much current as the galvanometer. From this, it follows that the current flowing through the galvanometer is either 1-10, 1-100 or 1-1,000 of the total current, and therefore it is only necessary to multiply the current, as indicated by the galvanometer, by 10, 100 or 1,000, according to what shunt is used. Such shunts are conveniently arranged in a box so that any of the multiplying values may be obtained by plugging in to any one of several holes.

The details of the construction of several standard types of galvanometers and specific directions as to their uses, will be taken up later.

As a current detector nothing can surpass the ordinary telephone receiver. Telephone men often overlook the fact that they have within their reach an instrument of such great sensitiveness and thereby fail to use a tool which is capable of giving most accurate results. In many of the tests, which will be pointed out later, the measurement depends upon securing a certain balance, determined by the *absence* of the current in the current detecting instrument. Such methods are termed "null" methods and the best example in ordinary practice is that of the Wheatstone Bridge. For many measurements depending on "null" methods, where the absence of current is the thing sought, the receiver is as good as a sensitive galvanometer and has the advantage of being infinitely more convenient. This statement has limitations, however, as the use of the receiver in place of a galvanometer will in some cases give erroneous results.

FOREIGN CURRENTS

By "The Arrester.'

LONDON, December 24, 1902.

A WRITER in one of the London electrical papers calls attention to the unsatisfactory state of things telephonic in Paris, as an offset to the telephone agitation at present going on in England. The Parisian telephones are in the hands of the government and at the present time there is general dissatisfaction owing to the shortcomings of the system. The principal reason for this outcry is that both the staff and the number of lines are altogether inadequate for the work required of them and the natural result is an inefficient service. The answer to the complaints of the public made by the French Post Office officials is that it has not the funds at its disposal to remedy the grievances or to extend the service. Considered in the light of the fact that the charge for unlimited service in Paris, says the *Electrical Engineer,* is as high as $80 a year—probably not exceeded in any other large city—this is surprising, and tends to the suspicion of bad management. It is asserted in certain Parisian circles that if a private company had the monopoly instead of the government, it would not only pay its shareholders big profits, but also find without difficulty the wherewithal to modernize and develop the system. This, at any rate, has not been the experience of this country, adds the *Engineer,* where the National Company insisted on maintaining its high charges until driven to reduce them by the competition of the municipalities in the provinces and of the Post Office in the metropolis.

* * *

The French telephone system is one of the worst examples of the evil effects of making the telephone a government monopoly. The facilities are poor, the service is abominable, the rates are relatively high and of development there is practically none. All sorts of curious restrictions and regulations surround the supply of the service and the equipment of the exchanges is quite out of date. The subscribers' stations are of the most antiquated description—a member of the staff of THE AMERICAN TELEPHONE JOURNAL recently tried to use one and is still marvelling at the experience—and resembles nothing so much as an ordinary wall set without a transmitter. This is because the French Post Office clings to the old style carbon microphone transmitter with a wooden diaphragm over which one has to bend in a devout attitude in order to speak into the telephone. A Frenchman using the telephone looks as if he were saying his prayers over a small desk attached to the wall, only usually his language and expression are more suggestive of cursing than of praying. A curious feature of the French service is that the subscriber has to provide his own station equipment, choosing a type approved of by the officials. Two receivers are usually supplied and the instrument is fitted with a battery bell, magneto generators being practically unknown in France.

* * *

What the *Electrical Engineer* says about company management is perfectly true. If a private company had the Paris telephone service it would no doubt pay good profits, give a good service and largely develope the system. And the same remark applies even more to other French cities than to Paris. As far as one can gather the telephone is very little developed in France anywhere but in Paris. It has often been pointed out that there are more telephones in use in New York than in the whole of France. The reason for this utter lack of development is government control. The telephone was originally in the hands of companies in France, but when the government saw that a profitable business was developing, the whole thing was taken over. Since that time very little has been done. Government telephone systems have not prospered in any country, and least of all in France. The telephone under government control does not flourish soundly anywhere, for two main reasons. One is that the telephone service is under the direct management of postal and telegraph officials who are more interested in the postal and telegraph services than in the newcomer and do not keep up to date in matters telephonic, and the other is that the supreme control is in the hands of politicians who know nothing of the telephone business and govern the whole service in an arbitrary way, often adopting quite unsound measures for purely political reasons.

Another note in the *Electrical Engineer* calls attention to the service rendered by the Post Office in London in those districts served by its telephone system in delivering telephonic messages at their destination in the same way as telegrams, and at half telegraphic rate. Only telephone subscribers can avail themselves of this facility (*i. e.*, such messages cannot be sent from public stations, and 30 words are the maximum for a message which is delivered by express messenger within a radius of a mile of the receiving office for a charge of 6 cents over and above the usual charge for a telephone call, which is 4 cents. The Post Office telephone scheme contemplates the establishment of a public station at every branch post office (of which there are several hundred, in London within a few months and there is little doubt but that the above arrangement will readily be taken advantage of by the subscribers to the system. In the same way the trunk lines can be used for this purpose, the additional charge being 6 cents a mile for the delivery of the message. When the Post Office has completed its metropolitan system it is conceivable that in some cases it will be found more expeditious to telephone messages to non-subscribers, than to use the telegraph, and owing to the limits placed on the length of a telegraphic message, it should certainly prove more economical.

* * *

This is a very similar plan to that advocated a short time ago by THE AMERICAN TELEPHONE JOURNAL as a means for adding to the revenue of a telephone company. There is no doubt that such a service would meet a public want and could be operated by a telephone company so as to be of advantage to it in several ways. Messages sent by telephone would be handled more quickly than ordinary local telegrams, since in many cases one part of the operation of sending a telegram—*i. e.*, taking or sending the message to the telegraph office—would be saved, as the message would be telephoned directly from the subscriber's station to the receiving operator charged with the duty of writing down messages for delivery. Even in the case of a message sent by a non-subscriber from a public station the service would be quicker than the average local telegraph service, as the delays incident to the accumulation of messages at telegraph offices, the slack work done at small branch telegraph offices and the re-transmission of messages would all be avoided. It is well known that the local telegraph service of all big cities is the most badly done branch of the telegraph service owing to the antiquated methods of handling the business at the numerous small branch offices. The electrical papers recently made note of a test made by the London *Daily Mail* of the London telegraph service, which showed that express letters in every case beat telegrams dispatched between the same two points.

* * *

So that a telephone-telegram service would, if properly managed, not only beat the telegraph service in point of speed, but could also easily under-cut it in point of price; in fact, could offer greater facilities for a lower price. A good rate that would pay a substantial profit as soon as a fair amount of traffic was worked up, would be fifteen cents for a message of twenty words of text, the address and signature to be free, and each word of text above twenty to be one cent extra. The ordinary ten-word telegram is too short for many purposes, especially for social messages—which would be a large part of the business of a telephone-telegram service—and also for business messages that are not put into code, as ordinary local business messages of course are not. A twenty-word minimum for the body of the messages would therefore be very popular as most people can put a hurried message into between ten and twenty words, whereas it requires some scheming and compression, often at the expense of clearness, to get even a simple message into ten words. On the other hand the difference between the cost of telephoning ten words or twenty would be almost negligible. A further reason for making the minimum twenty words instead of ten is that such a measure would betoken enterprise and indicate a cheapening of service, two points that always appeal to the public and awaken interest.

* * *

The service could be started in a small way by placing an expert recording operator at the main central office to take down the messages. This operator would have a special number quite distinct from all the others, say, 10,000, which would be printed conspicuously in the subscriber's list together with the proper indications to show that messages for delivery by hand should be telephoned to this number. A similar notice should be posted in all public stations. The staff of messenger boys could be small to begin with, to be added to as the traffic grew. As the service caught on the facilities could be extended by placing recording operators at other central offices and at the principal public stations. The important point is that the service should be smartly done from the very beginning. The messages should be neatly and clearly written on a good form—that might well bear an advertisement of the telephone service and rates on the back—and enclosed in an attractive envelope having a special device and imprint to call attention to the service. The messenger boys should be well chosen and well uniformed, and carefully checked as to their speed and conscientiousness in making deliveries. The whole service should be placed from the beginning under a capable superintendent, charged with organizing and supervising it; this superintendent should be a man of ideas, one with a high standard of efficiency and able to maintain such a standard at all points of the work. The success of the service would depend entirely on it being carried out thoroughly smartly.

CONVENTION OF CEDAR POLE MEN

CEDAR pole men from all over the country will wend their ways to Minneapolis, Minn., for the seventh annual convention of the Northwestern Cedarmen's Association, which will be held on January 12, 1903. This association includes every prominent firm in the country who deals in cedar poles, posts, railroad ties, etc.

To the vast majority of people interested in the Independent telephone business, the importance and enormous extent of the pole business is not realized. There are over sixty-five firms members of the association, and in 1901 their cedar product sales were approximately $10,000,000. It is hard to estimate in figures the approximate amount of sales during 1902. When one considers what great strides have been made in telephone construction work during the last year, it can easily be believed that this enormous 1901 total has doubled itself.

The Independent telephone business was really the father of the cedar pole industry. The association, which will hold its next meeting in Minneapolis on January 12, was formed just about the time of the introduction of Independent telephony in this country.

Of course, before the inception of the Independent movement there was quite a large demand for poles on the part of the Bell and the telegraph companies. Since the establishment of Independent companies and the formation of the Northwestern Cedarmen's Association, the telephone business has increased more than tenfold. This includes both local, long distance and farmer, or rural lines. In each of these branches of the industry poles are indispensable, and the vast increase in the business can be readily appreciated. That the pole men realize the importance of the Independent movement to their business is attested by the fact that they are coming more and more to interest themselvs in the Independents.

At the more recent conventions of Independent telephone men, the pole men have been taking a greater interest. This was particularly noticeable at the Inter-State Convention in Chicago, just over, where many of the more prominent pole men were represented.

The officers of the Northwestern Cedarmen's Association are: C. H. Worcester, Marinette, Wis., president; R. H. Downing, Minneapolis, Minn., vice-president; Fred H. Gilman, Minneapolis, Minn., secretary, and H. W. Reade, Escanaba, Mich., treasurer. The directors are: J. K. Wright, Marinette, Wis.; H. S. Gilkey, Janesville, Wis.; J. C. Kirkpatrick, Escanaba, Mich.; A. D. Watson, Chicago, Ill.

The Chicago, Milwaukee & St. Paul Railway, which practically covers the district embraced in the cedar pole industry, has made special arrangements for carrying delegates to and from Minneapolis to attend the convention.

SOME STEPS IN THE EVOLUTION OF CIRCUIT DESIGN

ARTICLE V.—THE LOCAL BATTERY METALLIC—SELF-RESTORING DROP SYSTEM

By J. C. Kelsey.

NO provision is so far made for a busy test, and metallic lines connected to grounded ones are likely to be noisy. While the system is designed primarily for metallic service, there must be a satisfactory method of giving grounded service. This is done by the insertion of a repeating coil in the cord circuit arranged with a suitable key so that the coil may be cut in or out at the will of the operator. If the grounded lines are most numerous, then the normal position of the key should include the repeating coil in the circuit. If the metallic lines predominate, the reverse should be the case. It would not be detrimental if the coil was left in circuit permanently, for it takes a very good ear to distinguish the difference with some of the late forms of coils. If a double-ringing circuit is desired the coil key should be placed between the ringing keys, so that the operator in ringing back with the answering cord will not have to do so through a coil. For ringing and talking through a repeating coil are entirely different, owing to difference in frequency, current and pressure. It is possible to talk through twenty-five ordinary repeating coils, the voice sounding clearly but as if thousands of miles intervened between the speakers; while it is hardly possible to ring a thousand-ohm bell through three coils. Repeating coils are now successfully made for ringing purposes, making the position of the coil depend only upon convenience.

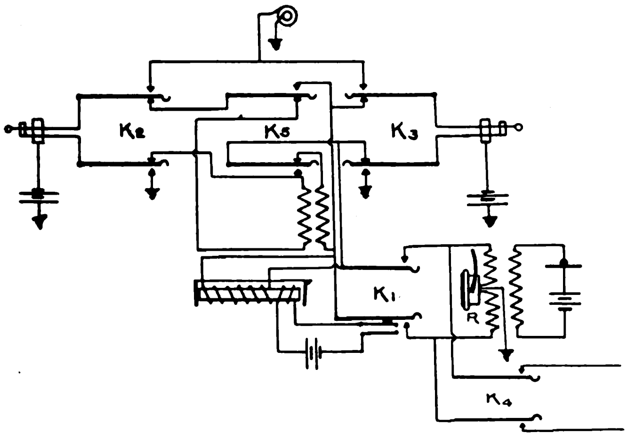

FIG. 28.

Fig. 28 shows the position of the coil. Normally, the coil is in the circuit and can be cut out by pressing the cam K^5. K^1 is the listening key, K^2 and K^3 the ringing keys of the answering and calling cords, respectively, and K^4 the order button or key.

Consider first the cord circuit in Fig. 28 with the key K^5 thrown so as to make the circuit strictly metallic; that is, by cutting out the repeating coil. A call will manifest itself by the falling shutter, and is answered by plugging in the jack and pressing the cam of key K^1, which places the operator's listening set across the line with a ground at the middle point of the receiver. If the calling line was metallic no unbalance would be set up by the ground as long as it is at the center. For an equal amount of positive and negative line charge would tend to flow to earth or to neutralize through the respective halves of the receiver windings, each setting up a magnetic field in the same core and of opposite polarities, hence no sound would be heard.

If the calling line was grounded, listening with the center of the receiver grounded would produce no unbalance, but a serious defect reveals itself. Fig. 29 is a skeleton sketch of such a listening set talking to a grounded line. Only one-half of the receiver could be used, while the other half is short circuited by the ground at the arrester frame, and the operator would find it difficult to hear grounded parties. Throwing the repeating coil key K^5 the operator readily converses with such lines, proving that the repeating coil is normally in the cord circuit. Another reason is that the operator in giving a metallic connection to a grounded party is not liable to ascertain whether a coil is needed or not, for it would take much valuable time to listen on every connection.

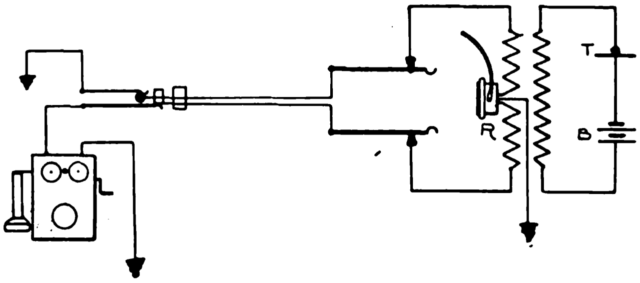

FIG. 29.

The requirements of balance demand, that not only must the receiver be exactly halved, but the secondary of the induction coil as well, because the secondary is always in series with the receiver, and if a ground connection is necessary to an operator's talking set, it must be at the center of both windings, as is shown in Fig. 30. Letters *a* and *b* are the primary terminals of the coil, *c* and *d* and *e* and *f* the respective halves of the secondary winding, with B R and T the battery, receiver and transmitter. The resistance of the secondary halves are about 125 ohms each, while the primary is about one-third of an ohm. The prevention of side tones or noise coming from other sources than the operator's voice is accomplished by reducing the sensitiveness of the transmitter. This is done by paralleling the primary winding of the induction coil with a three ohm shunt, as shown in Fig. 30, between *a* and *b*.

This ground at the center of the receiver is for the busy test, necessary to a multiple system. In the series grounded system, the busy test depended upon the grounding of the sleeves of the multiple jacks by the entrance of a single point plug, a ground being at the subscriber's station, and a battery between the ground and the operator's set, completing the test circuit. But in this metallic system no ground exists at the subscriber's station. Besides, the sleeves of the jacks are already grounded through the restoring winding of the line drop. If battery was placed between the ground and the operator's set in the self-restoring system a false busy test would be given.

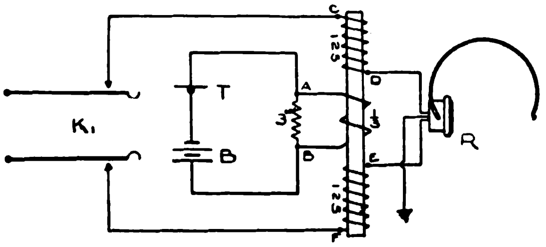

FIG. 30.

Suppose that somewhere in the multiple an operator has inserted a plug. According to Fig. 31 the eight volts of battery

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Editor's Note.—The first article of this series appeared in the issue of November 29. They will continue for many months.

on the sleeve of the plug finds a path to ground through the restoring winding of the line drop. The sleeves, normally at ground potential, have now all been raised to a potential of eight volts. Suppose that some one calls for the same number and the operator tests by touching the tip of the plug to the sleeve of the desired jack. As she does this the eight volt battery on the sleeves finds a new path to ground through the tip of the plug, the inner contact of the ringing key K², thence to the now closed contact of key K¹, one-half of the induction coil secondary and one-half of the receiver. Each tap of the tip of the plug to the sleeve of the jack gives a decided click to the operator's receiver and to the waiting subscriber as well. With the repeating coil normally in the cord circuit, no busy test can be obtained from the answering cord.

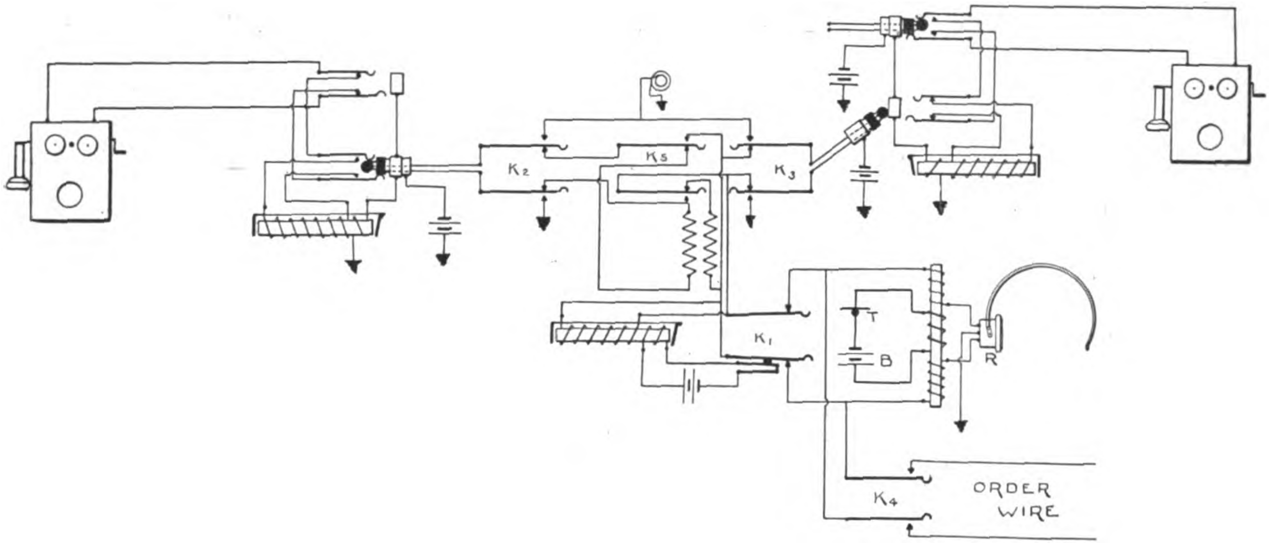


FIG. 31.

The American Telephone Journal has said "clip a second off the average telephone connection and the whole system feels the shock, or, rather, the effect." Such a statement sounds the keynote of circuit design, and throughout the entire telephone field every designer is not only building his circuits for good transmission and freedom from inductive effects, but is striving to clip off that second.

The self-restoring drop system was a step in advance, and it accomplished its mission when it saved that valuable second. While it certainly does save some time, yet it has not saved enough, and this system is loosing its place where seconds are worth millions.

The trunking circuits were not improved as regards time saving. The same method of disconnect was used as in the series system, and not a second of time gained, nor could be in any system which does not employ an automatic disconnect signal—one that shows instantly that the subscriber has replaced his receiver. The advantage attained is in the handling of a trunk so that the originating operator has complete control of the connection. Confusion is prevented because the "B," or trunk operator, cannot assign the trunk to any other operator before it is fully disconnected in the originating exchange. With the disconnect signal the trunk operator can work more surely, because no time is lost in disputing over double connections.

NEBRASKA INDEPENDENTS MEET

About twenty representatives of Independent telephone companies doing business in Nebraska assembled at the Lincoln Hotel, in Lincoln, on December 19 and 20, to hold the fourth annual convention of the Nebraska Independent Telephone Association. Among those in attendance were: Tom E. Parmelee, of the Plattsmouth Telephone Company, president of the State Association; E. C. Hanson, of Fairbury, secretary; W. J. Smith and Glenn Stevens, of the Farmers' Home Telephone Company, Shelton; Bruce Brown and W. J. Stadelman, of the Home Telephone Company, Kearney; J. E. Adamson, of the Central Telephone Company, Broken Bow; E. L. Brown and M. J. Brown, of the Chester Telephone Company, Chester; T. H. Pollock, and J. N. Wise, of the Plattsmouth Telephone Company; R. H. Elliott, of the Auburn Telephone Company, Alliance; W. H. Hurst and J. A. Frawley, Stromsburg; George F. Keefer, Eagle Telephone Company, Eagle; O. M. Thorp, of Wahoo; E. C. Hanson, of Fairbury, and E. A. Gantt, of Falls City.

Fully seventy-five Independent telephone representatives were present. It was made known at the roll call of companies that about 100 Independent organizations exist in Nebraska at the present date. This means between 8,000 and 10,000 miles of wire and about 40,000 telephones. In the last year the number of exchanges in the State has doubled. The longest line is at Broken Bow with 500 miles of wire. The average line runs about seventy miles.

The members congratulated themselves on the surprising growth in the few years that the Independent companies have been in existence The first meeting was held in 1899 with but Plattsmouth, Fairbury, Auburn and Nebraska City represented. Now the lines have spread over the eastern, southern and western portions of the State till it will take but a few connecting links to cover the greater portion of Nebraska. The line now being installed at Beatrice joining the line from Pawnee City, will make the chain complete between eastern and western Nebraska with the exception of Lincoln. No secret is made of the great desire of the Independent companies to secure a foothold in that city. As a result of the present meeting a committee will probably be appointed to act with the citizens to take steps to permit a new company to do business here. A foothold in Omaha has been secured where pay stations are located, and where a complete system will be installed. The people of South Omaha have voted a franchise by a majority of 2,000.

The program was particularly interesting and many ideas of interest to telephone men were expressed. A. M. Munn, of Nebraska City, gave a talk on "Farm Line Development;" C. N. Neill, of Beatrice, spoke on "Inspection and Maintenance of Rural Exchanges." General discussion followed each paper. Judge Gantt, of Falls City, talked on "Toll Lines, Toll Rates and Division of Tolls Between Connecting Companies."

A NEW IOWA ASSOCIATION

IN response to the call recently issued, between thirty and forty representatives of Independents in Western Iowa gathered at the Grand Hotel in Council Bluffs December 23, and organized the Western Iowa Independent Telephone Association, with these officers: H. A. Kinney, Woodbine, president; J. F. Miller, Creston, vice-president; Charles G. Cockerill, Jefferson, secretary; A. F. Felton, Harlan, treasurer; Executive Committee: J. F. Glenn, Denison; J. C. Mansfield, Shelby; W. B. Sweeney, Manning; George E. Atchison, Creston; H. A. Kinney, Woodbine

The meeting was one result of the recent meeting in Chicago of the Interstate Independent Telephone Association, and was called by the following representatives of southwestern Iowa Independent companies: George E. Atkinson, Creston Mutual Telephone Company; B. P. Babson, Conway Telephone Company; H. W. Cutshall, Shelby Telephone Company; J. F. Glenn, Crawford County Telephone Company; P. C. Holdoegel, Central Telephone Company; J. W. Huff, Monona Telephone Company; F. R. Musson, Musson Bros. Telephone Company; H. A. Kinney and M. A. Reed, secretary Woodbine Telephone Company.

While other matters of interest were discussed the question of obtaining an outlet into Council Bluffs and obtaining facilities for the establishment of a general exchange and terminals for the Independent companies in southwestern Iowa was practically the whole absorbing topic.

At the request of the meeting Attorney Emmet Tinley and Henry H. Van Brunt, members of the Council Bluffs Independent Telephone Company, appeared before the convention at the afternoon session and told of their plans to secure a franchise in Council Bluffs. They stated that while their ordinance had been turned down by the City Council last spring, they were still in the field and expected to be before the City Council again with another proposition for a franchise, and that in the event of their company securing it the question of the Independent companies in Iowa obtaining terminal facilities in Council Bluffs would to all intents and purposes be practically solved. Following the statements made by Messrs. Tinley and Van Brunt the convention adopted resolutions reciting the benefits such a connection would bring the Council Bluffs merchants.

Assurances were given that if a franchise could be secured in Council Bluffs by the local Independent company that the several concerns now operating throughout the State would complete within a short time the building of the copper metallic toll line which is now extended from Davenport by way of Des Moines to Atlantic, in Cass County, along the line of the Chicago, Rock Island & Pacific Railroad. Connection would be made with South Omaha whether an exchange and terminal facilities could be secured in Council Bluffs or not.

These committees were appointed: Long Distance Toll Lines, M. A. Reed, of Woodbine; J. F. Glenn, of Denison; Fred Marquis, of Onawa; Council Bluffs Terminal, H. W. Cutshall, of Shelby; A. F. Felton, of Harlan; H. McCartney, of Thurman.

The convention adjourned to meet at the session of the State Association in Des Moines on March 9. Among those present were: H. A. Kinney, president, and M. A. Reed, Woodbine Telephone Company, Woodbine, Ia.; W. B. Sweeney, Audubon County Telephone Company, Audubon, Ia.; W. M. Masterson, Extra; C. R. Benedict, H. W. Cutshall, J. A. Cook, J. M. Jones, L. A. Cutshall, J. C. Mansfield and Captain D. C. Cooper, Shelby Independent Telephone Company, Shelby, Ia.; J. F. Glenn, Crawford County Telephone Company, Denison, Ia.; A. F. Felton, Harlan & Avoca Telephone Company, Harlan, Ia.; Charles T. Cockerill, New State Telephone and Telegraph Company, Jefferson, Ia.; J. F. Miller, Montgomery County Telephone Company, Red Oak, Ia.; George E. Atkinson, Creston Mutual Telephone Company, Creston, Ia.; J. C. Sullivan, H. McCartney, Thurman Telephone Company, Thurman, Ia.; Fred Marquis, Monona County Telephone Company, Onawa, Ia.; I. D. Clark, Papillion, Neb.; T. H. Ewing, Plattsmouth; T. C. Parmelee, Plattsmouth; Lambert, South Omaha; E. B. Overshiner, Swedish-American Telephone Company, Chicago; W. R. Hind, Kellogg Switchboard and Supply Company, Chicago; E. B. W. Barnes, Valentine Clark Company, Chicago.

KEEPING BEFORE THE PUBLIC

AN Independent telephone company derives its greatest strength because of its closeness to the telephone-using public. They are not organized, maintained or operated by outside corporations or capitalists. The citizens of the town or city served by an Independent company are the stockholders, directors and operating and executive officers.

But notwithstanding this fact, the up-to-date Independent manager looses not an opportunity of keeping his company before the telephone subscribers or possible subscribers. He is ever adopting new schemes or devices for giving greater publicity to the work of his company.

One of the very latest ideas to come to our attention is a Christmas card distributed to the non-subscribers, as well as the patrons, of the Alabama, Mississippi and Tennessee Telephone Company. The card is reproduced below, just about as it was distributed:

1902

WISH YOU A . . . .

Merry Christmas and

Happy New Year.

C. W. BOLTON, Gen. Mgr.

Alabama, Mississippi & Tennessee Telephone Co.

COMPETITION GOOD FOR TOLEDO

IT has been a matter of curiosity in Toledo as to the result of the so-called war which is now being waged between the Bell and Home Telephone companies, says the Toledo, Ohio, *Bee*.

There are about as many Home telephones as there are Bell and the war has been of great benefit to Toledoans in general.

Inquiry at the local offices of both companies has disclosed some interesting figures.

Originally, the Central Union Telephone Company had in operation in Toledo, including the East Side branch, about 6,000 telephones.

No sooner had the announcement been made that the Home Telephone Company had been organized to operate in Toledo than a battle for subscribers resulted.

Rates, which had hitherto been high, were cut. Solicitors by the dozen were put in the local field. These agents of the Central Union Company were kept on the hustle all the time and in a short time the Home company placed agents in the field and the battle began in earnest. It has waged now for three or four months or more.

Scores of men were given employment in erecting the Home Telephone plant and in setting the wires and connecting the telephones. Dozens of solicitors have been given employment by both lines.

What has been the result of this hustle and bustle business?

Inquiry at the Home Telephone office brought fourth the information that that company had about 5,500 telephones in operation and in the neighborhood of 6,000 subscribers, with more subscribers coming in every day.

The Central Union Telephone Company, announced that it has in the neighborhood of 6,000 telephones in active operation, including branch telephones, party line telephones, etc., and about 6,200 subscribers.

The result is plain to be seen. There are in Toledo to-day between 11,000 and 12,000 telephones in active operation, against less than 6,000 a year ago.

The business of the one company has been increased and that of the new company has reached large proportions and is increasing daily.

The service to the general public is much better, much quicker, and more satisfactory all around. The cost of the service has been lowered.

Not only the wealthy and well-to-do have telephone service in their homes but people in the middle classes, the laboring classes, etc., can now afford it.

SHOWING OF A NEW COMPANY

THE annual meeting of the stockholders of the DeWitt Telephone Company, of DeWitt, Ia., was held recently. W. A. Cotton was chosen chairman of the meeting, and W. E. Betzenderfer was chosen secretary.

The secretary of the board of directors read his report of the condition of the company as follows:

RECEIPTS.	
Capital stock	$15,000.00
Loan from bank	7,000.00
Receipts from rentals	1,644.80
Receipts from tolls	65.40
Stock subscriptions	17.00
Advance freight charges refunded	63.40
Material sold	90.28
To balance disbursements	6.12
Total	$23,886.98

The total disbursements were $23,886.98.

Two hundred and forty telephones are in working order, and thirty more will be installed in the next fifteen days. The estimated annual income is $4,338.00, and from tolls $200.00, making a total of $4,538.00.

Two country lines are under contract, which when finished will give DeWitt connection with the following towns: Welton, Petersville, Charlotte, Bryant, Elvira, Malone, Low Moor and Folletts. There are 175 miles of metallic wire completed, and thirty miles to complete, and also thirty-five miles in DeWitt.

AMERICAN TELEPHONE AND TELEGRAPH

THE Boston *Financial News* prints the following in regard to the finances of the parent Bell Company: The directors of the American Telephone and Telegraph Company will meet next week to declare the regular dividend of 1½ per cent. and ¾ extra on the stock.

The recent issue of $21,937,300, payment for the final instalment of which $10,937,300, will be due on January 15, will not participate in this disbursement, as dividends do not begin to accrue on this issue until after January 1, 1903, so that it would participate in the dividend for the first time in April, 1903.

With the new stock the company will have issued by January 15 a total capital of $136,883,800. The annual dividend requirement on the total amount would amount to $10,266,285. Including the $5,000,000 sold to New York parties at private sale and the recent issue of $21,937,300, the actual amount of stock outstanding on January 15, 1903, will be $109,685,300, dividend requirements on which would be annually $8,226,398.

The total earnings applicable to the payment of dividends on January 1, 1902, amounted to $7,398,285 so that there would be an apparent deficit in the earnings on the above amount of stock if there was not a corresponding expansion of receipts, of $828,113. The total dividend requirements this year as compared with those of the year ended December 31, 1901, will reflect the increase only on the $5,000,000 of stock sold at private sale in New York, which would require only $375,000 in addition to the amount paid last year, $5,050,000, so that disbursements to the stockholders for the year ending December 31, 1902, will reflect but a slight increase. The increase in interest on account of the issue of $13,000,000 of 4 per cent. collateral trust bonds to pay for the stock of the Western Telephone and Telegraph Company will increase the interest charges about $520,000.

As against the increase in dividends and interest there has been a steady growth in business transacted as shown in the instrument output, which, on November 20 the last date of publication, reflected a total increase in the number of instruments outstanding of 631,380 as compared with the same date last year, or about 25 per cent. The total number of instruments was 3,099,346, as against 2,467,966 for the same period last year.

Estimating the number of subscribers at 40.5 per cent. of the number of instruments, multiplying this amount by $50, which is about the average price received from each subscriber, and deducting from this the estimated gross business of the long distance lines, about $4,000,000, it will be found that the American Company's share of the total business of the sub-companies will amount to about $29,380,875. Net earnings at 29 per cent. of the gross would yield as net from the subsidiary companies to the American Telephone and Telegraph Company about $8,520,453. To this add the estimated net of the long distance companies, which may be given as about $2,000,000, and the total net income of the parent company for this year would be about $10,520,453. This would show 11.9 per cent. earned on the stock on which dividends were paid this year, or $87,748,000, and 9.5 per cent. on the total amount outstanding on January 15, 1903, or $109,685,300.

STROMBERG-CARLSON BANQUET

ON the evening of December 12th, the Stromberg-Carlson Telephone Manufacturing Company, of Chicago, Ill., and Rochester, N. Y., gave a banquet at the Great Northern Hotel, Chicago, to its staff of employes.

The banquet was given largely to enable the men to meet each other and also to explain to the salesmen the use of a new book of standard switchboard specifications, which the company has recently gotten out. This has been pronounced by many prominent telephone men, a most complete treatise on telephone switchboards. It will, no doubt, help to standardize all the apparatus manufactured by the Independent companies, as well as to maintain their own standards.

Following the banquet Mr. Bowen, the company's Iowa representative, in behalf of the salesmen, presented Messrs. C. W. Stiger and F. L. Middleton each with a scarf pin, with diamond setting, remarking that these were the two men with whom they always came in contact, providing their expense account was above the average. Following the presentation, Messrs. Stiger and Middleton responded in a fitting manner, thanking the gentlemen for the token of their appreciation, also for the efficient service rendered.

The banquet was a delightful occasion, and was followed by short remarks by many of those present. The following gentlemen were present: Alfred Stromberg, T. R. Finucane, C. W. Stiger, A. J. Rousseau, H. G. Webster, A. Haubrich, Eugene L. Brown, F. L. Martin, William Bowen, F. L. Middleton, R. B. Tyler, E. C. Lewis, H. B. Hewitt, H. D. Eddy, L. R. Krum, C. E. Knickerbocker, A. S. Munsell, G. A. Muir, Paul D. Meyers, G. H. Pierce, B. B. Willis, H. L. DuPont, G. L. Burlingame, C. H. Hague.

OPINION AND COMMENT

A YEAR OF THE JOURNAL

The American Telephone Journal has completed its first year of issue in the improved form adopted in January last. While there are many difficulties in the way of the production of a successful journal exclusively devoted to such a specialized and technical subject, we believe we have succeeded in surmounting some of them and we have strong faith in our ability eventually to overcome all, and to present to our readers a paper that shall be both readable and valuable from the front cover to the back. That the telephone business provides many subejcts of discussion of the deepest interest is not a matter of doubt to any intelligent mind engaged in it, and that a journal devoted entirely to the discussion of those subjects fills a real want among telephone men has been made thoroughly evident during the past year.

To Independent telephone men especially is such a journal almost a necessity, and we believe that if we had not taken upon ourselves to become pioneers in the establishment of The American Telephone Journal, other Independents would have found themselves obliged to undertake the work.

In taking stock of our first year's progress, and in wishing the whole Independent telephone industry a bright and prosperous year during the whole of the twelvemonth now beginning, we wish to point out a few of the ways in which the Journal can be useful to Independent telephony and a few of the ways in which Independent telephone men can be useful to the Journal. It is our intention to keep The American Telephone Journal the representative Independent telephone paper. We believe that the industry requires such a medium for its welfare and progress, as it is mainly by the quick exchange of experience and the rapid and wide circulation of ideas and suggestions that general progress is made. The contents of the Journal during the past year should be a good earnest of our desire to make its pages useful in just that way. We have been successful in enlisting in our columns many of the brightest minds, most experienced engineers and managers and readiest pens to be found in the ranks of Independent telephony. Before long we hope to have it an understood thing that any Independent telephone man having an idea to suggest, an experience to record, or a question to ask shall address his co-workers through the columns of the Journal as a matter of course, knowing that his words will so reach the eye of every Independent telephonist.

The policy of The American Telephone Journal is to promote the progress of Independent telephony in every possible way. We shall ever be the advocates of the soundest methods in all branchs of the industry; in a few words our guiding motto is, as it should be that of every telephone man, there is nothing too good for the telephone. The soundest methods of finance, the best quality of construction, the most scientific rates, the most alert and enterprising management will always be preached and upheld in these columns, and no effort nor expense will be spared to procure and publish the most authoritative opinion and information on all these points. We shall watch the general progress of telephony wherever the telephone is used, not that the foreigner can teach us much in telephony, but because it is well to know what to avoid as well as what to adopt and also because we believe there are good markets for the American telephone manufacturer in various parts of the world. In all of this our readers can help us by sending to the Journal news of the progress of telephone enterprises and their ideas and experiences in the many varied branches of telephone work. No undertaking is thoroughly successful without co-operation, and there is hardly a reader of the Journal but can help to make it more interesting and useful to all other readers by becoming a contributor.

In this connection, the editor again wishes to express to the readers of the Journal, his appreciation of their unstinted praise. These congratulatory letters are pouring in each day, and the editor would like to show his recognition of these courtesies, by publishing every letter. As explained last week, such a proceeding is impossible in justice to the requirements of other matter The editor, however, feels that it is no more than right that some of these letters picked at random, should be published.

Dear Sir:
Your special issue of December 6 seems to me to establish conclusively that the American Telephone Journal is THE American telephone journal. Herbert Laws Webb.
London, Eng.

Dear Sir:
We take pleasure and secure a great deal of information in reading your interesting Journal every week. It is certainly the telephone paper par excellence.
The Northern Construction Co.
Ottawa, Ill.

Dear Sir:—We read the American Telephone Journal with pleasure and profit.
Parke County Telephone Co.
Rockville, Ind.

Gentlemen:
We consider it a necessity in our office and a great help to the telephone business in all its branches. Roy W. Evans,
Manager West Liberty Telephone Exchange,
West Liberty, Iowa.

Dear Sir:
Except for the quantity, I do not note any particular improvement in your December 6 issue over your regular numbers. The character of the latter leaves very little room for improvement. I would not be without the Telephone Journal if I had to pay $10 a year for it. It would be cheap at that figure.
Chauncey Smith,
Atlanta, Ga.

Dear Sir:
I take pleasure in stating that I have found the returns from the advertisement of our electric measuring instruments in your Journal to be entirely satisfactory. The replies received show that you cover the field thoroughly and that the advertisements are read by those who take the Journal. Louis M. Pignolet,
New York.

Gentlemen:
It is a credit to the editor and a great satisfaction to the advertiser to have such a valuable publication before the people. We like to comment upon your success, for you deserve it. The Medora Milling Co.,
Medora, Ind.

Dear Sir:
The Convention Journal is a winner. It is a credit to the editor and to the intelligence of every person engaged in the telephone business. A year's collection of Journals will be a gold mine in the way of information.
Very truly,
J. C. Kelsey,
Purdue University.

CONTEMPORARY CROSS TALK

By "The Listening Key."

WE have discussed two directions in which time may be saved in the average local telephone message from the subscriber's end of the system. The first, a greater expertness and promptness in operating the station and in handling the message; and, the second, a more punctilious observance of what has been called telephone etiquette. If there could be instilled into all telephone users a thorough understanding and appreciation of the important part they play in the operation of the system, and consequently in the supply of the service they themselves receive, there would be a substantial and general gain in the efficiency of the service and in the economy and productiveness of the plant. There has been much improvement of recent years in the handling of the service by the subscribers. The long use of the telephone has naturally taught many how to use it best, the improvement that has taken place on the inside in the way of better equipment and a better trained staff has reacted on the outside and has induced to a certain extent smarter operating on the part of the public.

* * *

The answer to the call of the telephone is quicker than it formerly was, though yet not by any means so quick as it might be, and the practice of calling by deputy is not nearly so widespread as it once was, so that on the whole telephone subscribers are better telephone operators than they once were. The chief cause of this improvement is the general improvement that has taken place in telephone equipment and in exchange operating. The extensive use of desk instruments makes it easier for a subscriber to answer quickly and also make it less likely for him to call by deputy. Since he has the telephone close at hand he can answer instantly, at the first sound of the bell, and when he is making a call himself he has no excuse and no object for not remaining at the telephone himself until the person he wishes to talk to appears at the other end of the line. The introduction of private branch exchanges has also done much to improve the operating of the subscriber's end of the line. At a private branch exchange served by a competent operator the great advantage is gained that all calls are handled at the subscriber's end by an expert, by one who is familiar with the inside working of the system as well as with the nature of the traffic of the branch exchange.

* * *

Another point that has made for better operating by the subscriber is the great improvement in transmission. Not so many years ago the service was slow and the talking often bad, or at least difficult. This, coupled with the general use of wall instruments, discouraged principals from using the telephone any more than they could possibly help. Those were the palmy days of the office boy and the junior clerk, as all telephone calls were made by them and received by them. Thus arose both the habit of delaying the answer to a telephone call and the habit of making telephone calls by deputy. Now, however, that good, clear talking is the invariable rule, quick service from the exchange is always to be depended upon, and as the telephone is at his right hand, the principal uses the telephone as freely as his office boy once did, and very much better. In fact, ingenious persons have discovered that whereas it is often difficult to get into the office of a man of importance it is comparatively an easy matter to get him on the telephone.

* * *

This point of the shorter and more business-like message brings us back to the question of telephone etiquette. We know how aggravating it is to be called by deputy. To answer the imperious ring of the telephone, to be asked, usually in the rasping voice of an office boy, if you are Mr. Blank, and then to be told in the same rasping voice to "wait a minute, Mr. So-and-So wants to speak to you," arouses a feeling of exasperation even in one of an ordinarily patient and gentle disposition. That breach of telephone etiquette has already been discussed, and it naturally leads to another—the frequent use of the phrase, "Who are you?" To be asked bluntly who you are, when you have gone to the telephone in answer to a call, is distinctly aggravating. Some people are so much aggravated by this style of address over the telephone that they deliberately avoid saying who they are and reply by the counter query, "Who are *you?*" Then there is a fencing match and a display of dialectics, and often of "apoplectics," waste of time and temper of the two contending parties and the consequent inevitable waste of time of the plant.

* * *

It is the usual practice in writing telegrams and letters to put the name of addressee first and the signature of the sender last, but this is not the invariable practice, although generally speaking it is the most usual and convenient form of written message. There are plenty of exceptions, as, for example, a "memorandum" generally shows at the top whom it is from, instead of at the bottom, as with a letter. Telegrams are usually quoted as "from JONES to SMITH," or "from the SECRETARY FOR WAR to the COMMANDER-IN-CHIEF," and when stories are told by means of letters, or public documents contain a series of correspondence by letter or telegram the names of the sender and recipient of each dispatch are put at the top of each. This practice shows that it is recognized as being of prime importance that the recipient of a communication should know at once from whom it proceeds, and that for a clear understanding of correspondence by a third party, that party should know at the beginning whom a dispatch is from as well as whom it is addressed to.

* * *

We carry out this principle, when you come to think of it, with all the written messages we receive. The first thing we look at is the signature, if the message does not show at a glance who the sender is. A telegram is usually on one page and the signature is seen at the first glance; a business letter usually has a printed heading that indicates at the top who the writer is, and with private letters we know as a rule by the handwriting on the envelope who the writers are before we open them. When one gets a private letter in an unknown hand one instinctively glances at the signature first of all to see whom it comes from. This all goes to show that with any communication we want to know first of all who is the sender of it. Why should it not be the same with telephone messages? Why should a man feel at liberty when he calls me up to ask me who I am before he is willing to say who *he* is?

* * *

True, it is the blunt and irritating "Who are you?" that is the most aggravating form of this particular breach of telephone etiquette. When the inquiry is put in the form of "Is that Mr. Blank" it is not half so bad, for that form at least shows that the speaker knows your name and wants to talk to you. In fact, in certain cases, as for instance in working through a branch exchange or in speaking to any extension station when the first call has been answered by some one else, it is an entirely natural form of opening a telephone message. You giving an affirmative answer, the caller goes on to say "I'm So-and-So" and proceeds with his message. A large proportion of telephone subscribers do begin their telephone calls in that way and very often it works all right, as, if everything has been accurately done, the chances are that the person who answers *is* Mr. Blank. But if it should happen to be some one else he promptly answers, "No, who are you?" and there comes in that irritating "Who are you?" again. How much more smoothly the service would work if every caller, having satisfied himself that he was connected to the right number, would say first who *he* is and then ask for the person he wants to talk to. He would be falling in with the general custom of making known at the outset of a communication the name of the sender, which is what we all instinctively want, he would avoid all cross-inquiries, eliminate "who are you?" and save time generally. The order of opening a call would then be: "Is that 994 Main?"—"Yes"—"This is Mr. Jones talking, is that Mr. Blank?" or "is Mr. Blank there?" We have all had experience of the various ways of opening a telephone call and we all know which pleases us most. Certainly it is the last which is both the most practical and the most polite.

POLE LINE CONSTRUCTION—ARTICLE V.

By J. W. Lattig, General Superintendent of the United Telephone and Telegraph Company, Philadelphia.

Long Spans.—The terminal poles at any long span (200 feet or more) shall be head guyed, and, if possible, side guyed in both directions Additional poles shall be set within seventy-five feet of such terminal poles, and head guyed to the terminal poles.

Street Crossings.—Wherever the pole line changes from one side of the street to the other, the crossing shall be made at an angle of about 45 degrees. Such crossings shall be guyed in the manner most applicable to the existing conditions as shown in Figs. 38, 43 and 44.

Curves.—All curves shall be thoroughly guyed. Figs. 21 and 24 shows the direction in which the guy shall be placed for different kinds of curves and conditions.

Guys.—All guys shall be made of seven-strand 5-16 inch guy rope. They shall be pulled by means of a set block and tackle and fastened with one malleable iron clamp of the style and dimensions shown in Fig. 18.

Guying to Trees.—Guys may be attached to suitable trees after having first obtained the consent of the owner in writing.

The guys shall be preferably attached to the tree trunk. In exceptional cases, they may be attached to live limbs, close to the trunk, provided the limb has a diameter exceeding five inches.

The trunk or limb of the tree shall be protected from injury by being covered with strips of hard wood, each strip to be not less than one inch thick and twelve inches long, and not over two inches wide. The guy shall be wrapped twice around the tree, and fastened with one guy clamp. Fig. 40 shows the method of guying to the trunk of the tree.

Whenever the guy rope is attached to an iron rod, a thimble shown in Fig. 17 shall be used. The ends of the guys shall be wrapped twice about the pole and fastened with one guy clamp. The wrappings may be held in place on the back of the pole by five galvanized staples. The lower end of the anchor guys shall pass through a thimble attached to a guy rod. The guy rod shall be fastened to an anchor log.

Guy Stubs.—Guy stubs shall only be used to raise the guys to sufficient height to clear and prevent their obstructing thoroughfares. An anchor shall be attached to each stub.

When impossible to locate anchor for a guy stub, the stub may be braced as shown in Fig. 36.

The method of attaching guys to the guy stub is shown in Figs. 34, 35, 36 and 37.

No guys shall be attached to buildings, except where authorized by the superintendent.

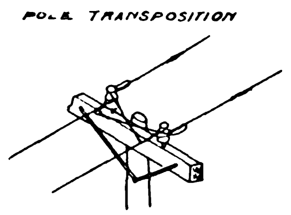


FIG. 46.

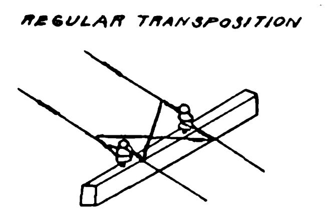


FIG. 47.

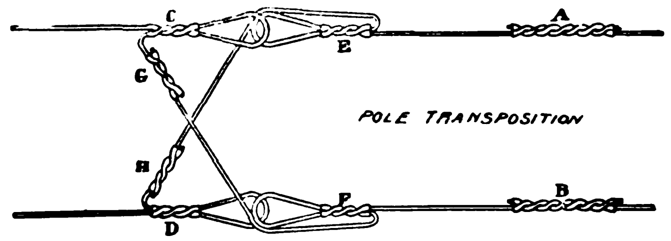
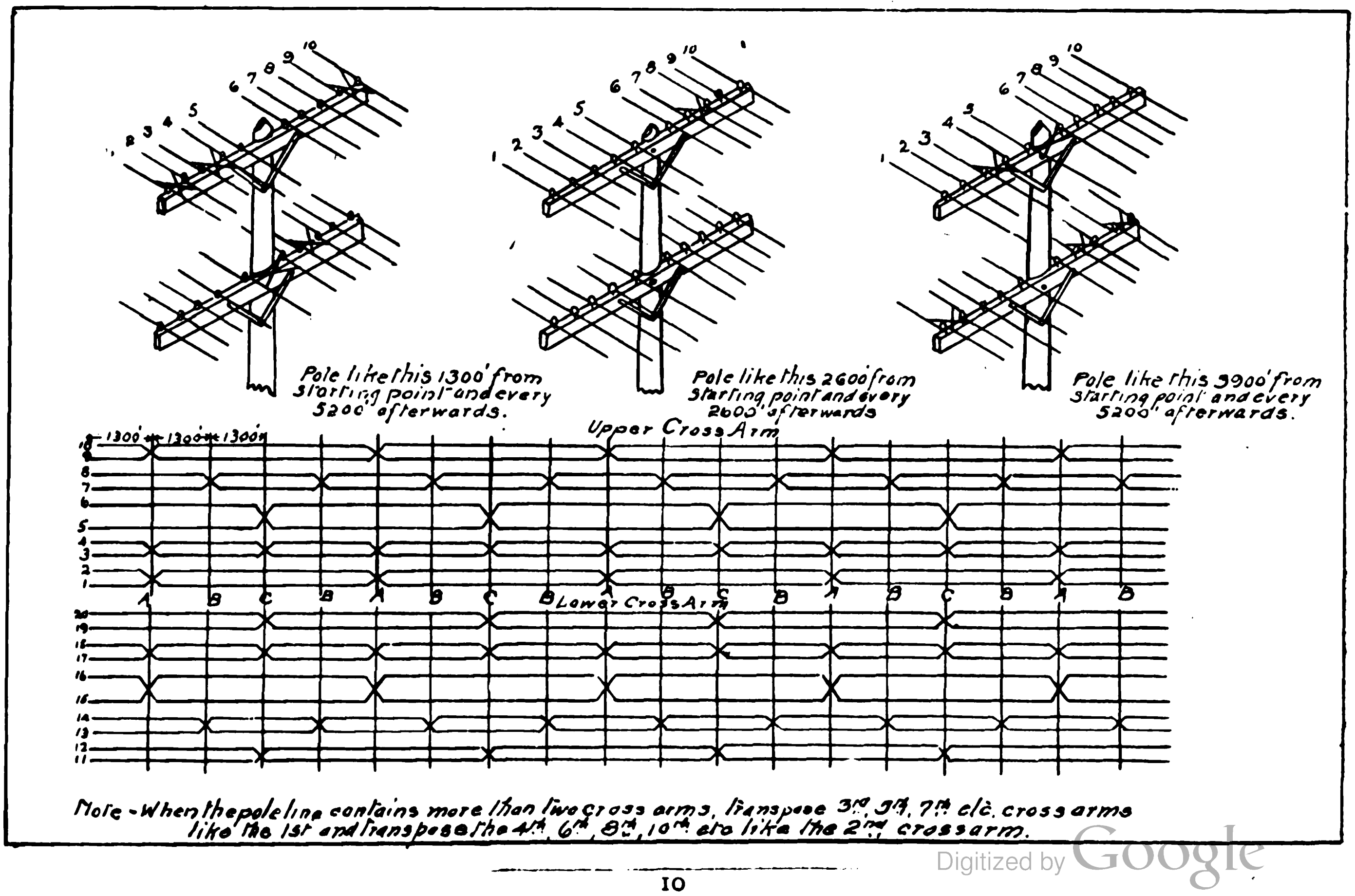


FIG. 48.

FIG. 52.



Pole like this 1300' from starting point and every 5200' afterwards.

Pole like this 2600' from starting point and every 2600' afterwards

Pole like this 3900' from starting point and every 5200' afterwards.

Note - When the pole line contains more than two cross arms, transpose 3rd, 5th, 7th etc. cross arms like the 1st and transpose the 4th, 6th, 8th, 10th etc like the 2nd cross arm.

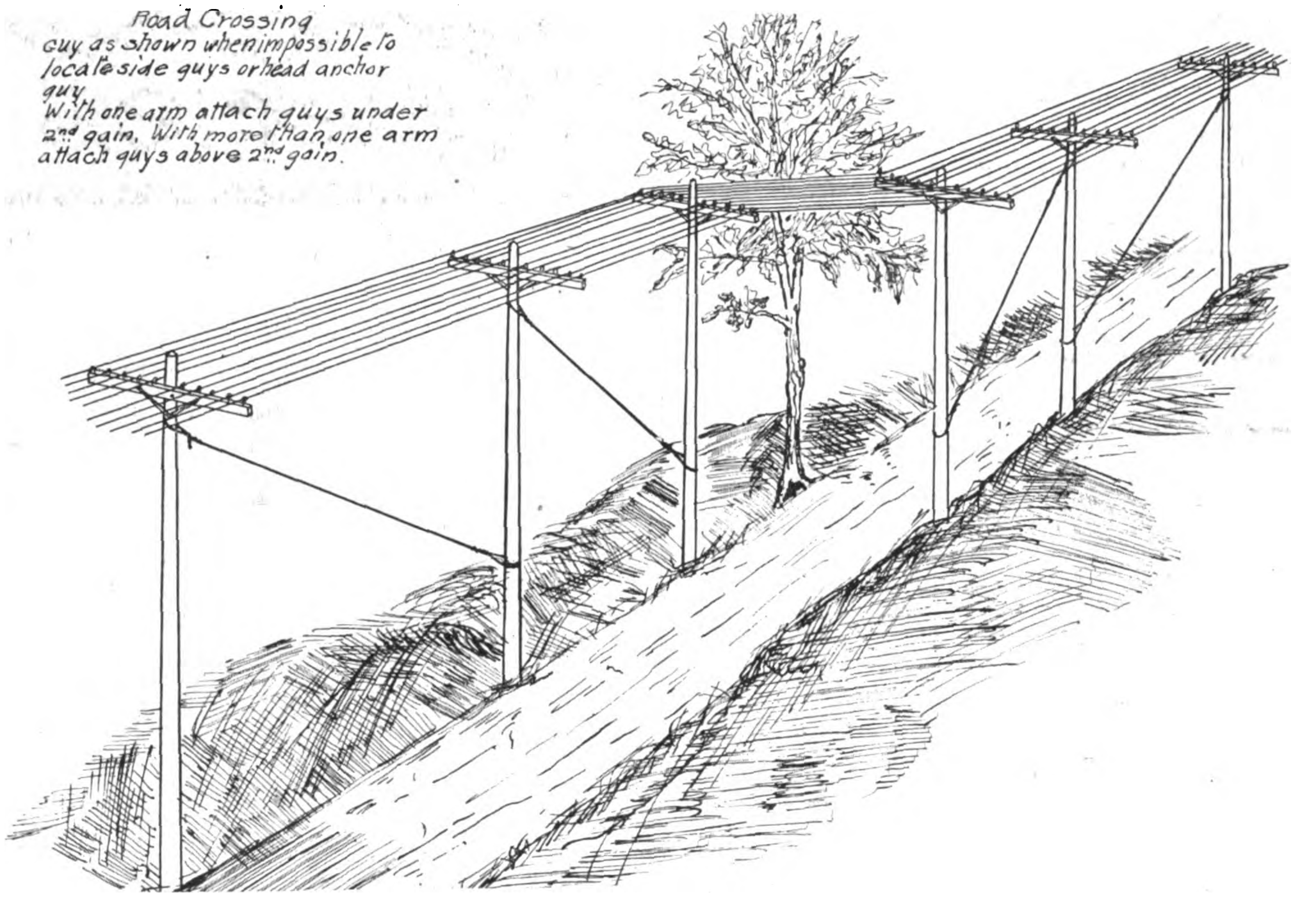

Road Crossing
Guy as shown when impossible to locate side guys or head anchor guy.
With one arm attach guys under 2nd gain. With more than one arm attach guys above 2nd gain.

FIG. 43.

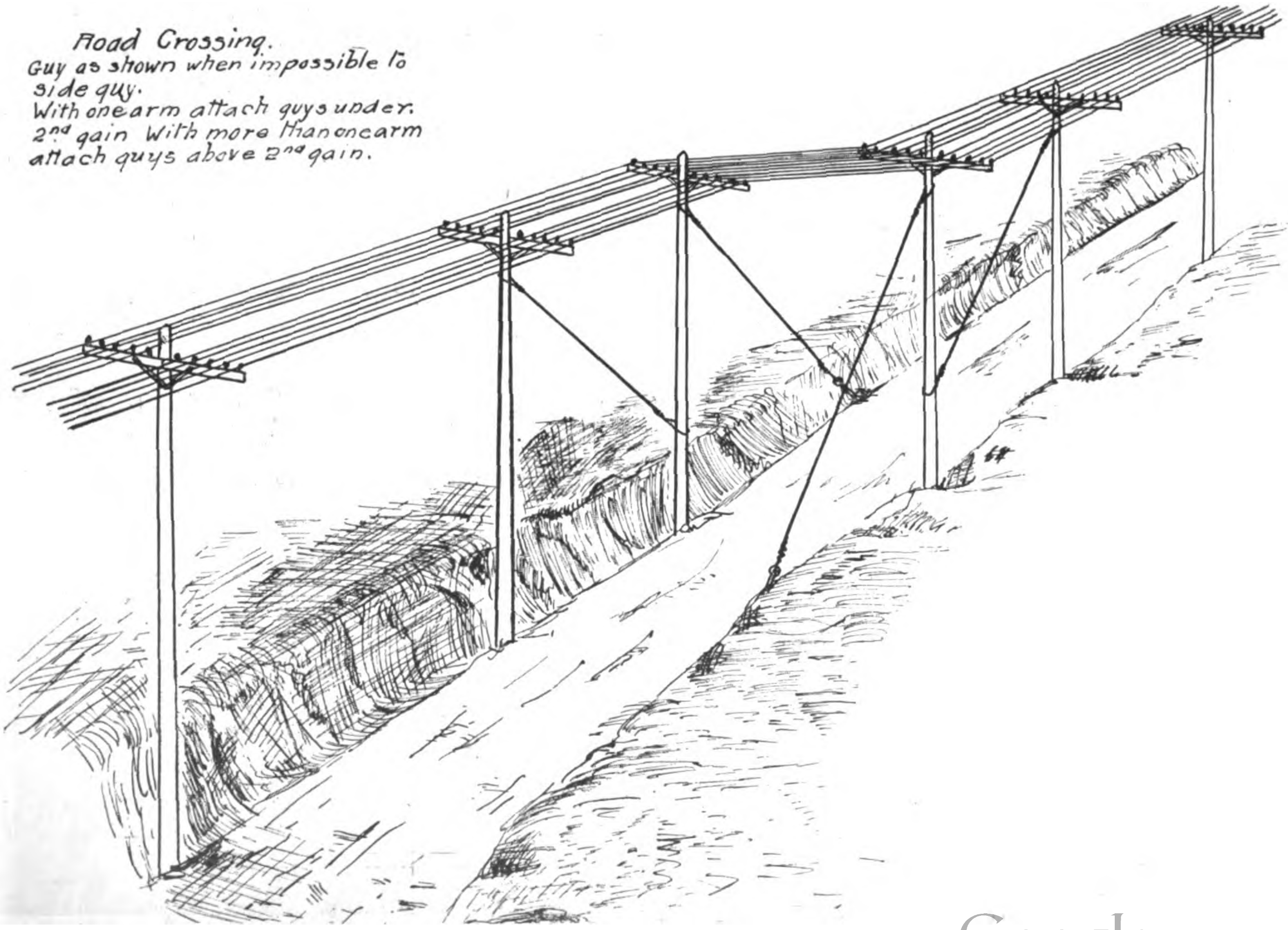

Road Crossing.
Guy as shown when impossible to side guy.
With one arm attach guys under. 2nd gain With more than one arm attach guys above 2nd gain.

FIG. 44.

In hilly country, place head guys so as to hold the downward strain of the line, as shown in Fig. 23.

Pole Braces.—All poles having a side strain shall be reinforced against that strain where possible. In such cases the pole may be braced in the manner shown in Fig. 29. The joint is to be painted with a thick coat of metallic paint; use braces wherever it is less expensive than anchor guying.

Double Pole Braces.—In all cases where rock, quicksand, or other obstacle renders the cost of the standard method of bracing or double siding excessive, the pole may be double braced, as shown in Fig. 30 and as follows:

The braces are to be of sound cedar or chestnut, and not less than 18 inches in circumference at the top. The butts are to be set at least 3½ feet in the ground and are to be supported on a plank, large stone or solid ledge, as shown in Figs. 25, 26, 27, 28, 29 and 30. "A" fixtures shall be double head guyed.

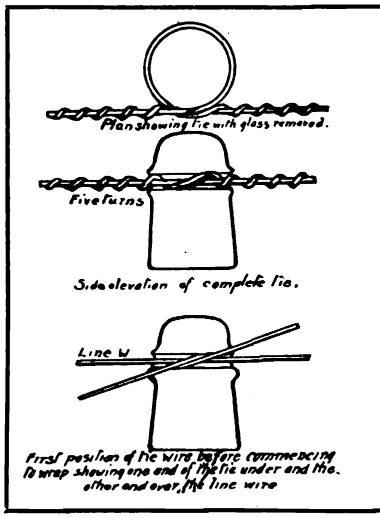

Plan showing tie with glass removed.
Five turns
Side elevation of complete tie.
Line W
First position of the wire before commencing to wrap showing one end of the tie under and the other end over the line wire

FIG. 49.

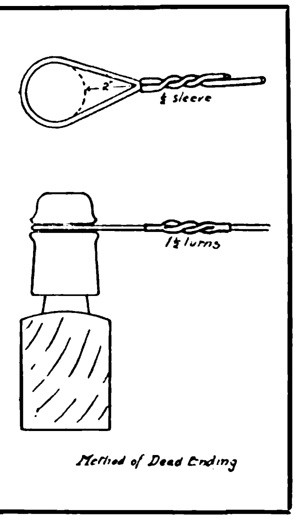


FIG. 50.

Rock Guying.—When convenient, anchor or side guys may be attached to solid rock, as shown in Fig. 42.

Line Guying.—On a line containing one cross-arm, head guy only as hereinbefore specified.

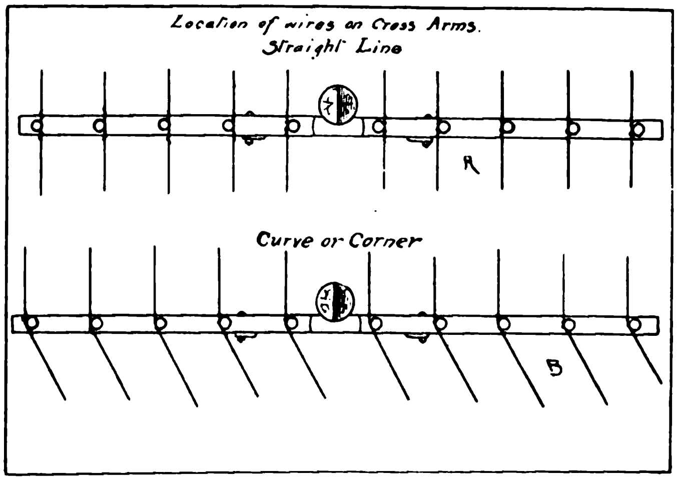


FIG. 51.

On a line containing two cross-arms and more than ten wires, double head guy and double side guy every mile.

On a line containing three cross-arms and over twenty wires, double head guy and double side guy every half mile.

On a line containing four cross-arms and over thirty wires, double the guys on corner poles, double side guy every quarter mile, double head guy every half mile, and use additional side guys where necessary. "A" fixtures and braces shall be considered equivalent to side guys. Additional reinforcements may be used where, in the judgment of the superintendent, it becomes necessary.

All work covered by special estimate, which will carry all detail information as to kind of wire and size of same, number of circuits, etc.

Queries

We have a 100 pair, No. 19 conductor, paper insulated, lead encased cable suspended under a wagon bridge. The messenger is secured to a girder every 16 feet. The cable has been up about one and a half years and the vibration of the bridge has caused the casing of the cable to break in several places. Do you think that if we were to hang this cable from the messenger with a spiral spring that the spring would take up the vibration sufficiently to eliminate further trouble? E. C. S.

The American Telephone Journal has been in receipt of several inquiries of a nature similar to the above. For this reason we have had two very prominent telephone engineers give their opinions as to the advisability of spiral springs, or as to what method could be used to secure good results.

Mr. W. C. Polk, engineer of the Central Construction Company, now building the plant of the Kansas City Home Telephone Company, gives his opinion as follows:

"This is a question that has been troubling telephone men for quite a while. If the vibrations are severe it will possibly be difficult to provide an efficient remedy. In a case of this kind it is first essential to be sure that the lead sheath contains three per cent. of tin, which I have found effective in some cases; that is, where the lead sheath without tin would not stand the vibration, a sheath with 3 per cent. of tin would. Marlin hangers also help to relieve the strain from vibration and make the cable much safer than if attached to the messenger wire with metallic hangers.

"I do not think the spiral spring would be of any benefit unless it was placed in such a way at each girder that it came under the messenger wire so that the weight of the messenger and cable would be on top of the spring and not hung from the spring."

Mr. George S. Du Perow, former engineer of the United States Telephone Company, gives his opinion as follows:

"In my mind this vibration could not be remedied by hanging the messenger with a spiral spring, as the vibration would still continue and certainly would not be in unison the entire length of the bridge. I have had considerable experience in bridge crossings of all kinds, and in no case have experienced any trouble in the cable being injured in any way. I have always used a hanger, especially constructed to fit the place for which it was intended, and have put it up with rubber cushions."

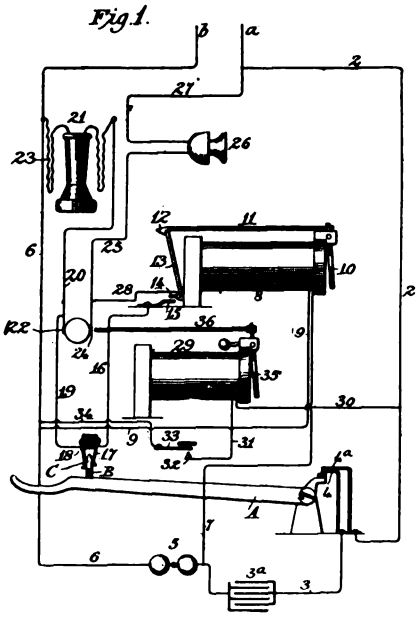
Patents

C. H. Egan, of Durham, N. C., patents (No. 714,680) a pay telephone. The apparatus is illustrated in Fig. 1, a diagramatic view of the circuits, and in Figs. 2 to 7 inclusive showing detail.

The object is to provide a system by which the party desiring to use the telephone will, after having called the central office by raising the hook, deposit a coin, which coin completes the talking-circuit, enabling the subscriber to talk to the party, or if the subscriber cannot be placed in communication with the desired party the operator will return the coin to the subscriber. After the subscriber has finished conversation the coin will pass into the telephone to a point beyond the reach of the subscriber. The connections and circuits are such that the central office will upon sending the current over the line cause the bell to ring at any instrument and at the same time complete the talking-circuit through said instrument,

Referring to the drawings *a* and *b* indicate the main lines. From the line *a* there extends a branch 2, which communicates with a line 3 through contacts 4 and 4^a, both of which are closed by the inner end of the receiver-hook A when said hook is down.

Fig. 1.



Line 3 contains a condenser 3^a; 3 passes to the ringer 5 and then a through line 6 to main line *b*. Line 3 is also provided with a lateral or branch 7, which extends to a relay or electromagnet 8. The opposite terminal is connected by 9 to the line 6. The coil 8 works in connection with a pivoted armature 10, which has an arm 11, carrying a hook 12, which normally holds a pivoted plate 13 in the position shown in Fig. 1. Plate 13 is provided with a finger 14, which when the armature 10 is drawn inwardly and plate 13 is released, swings outwardly by gravity and comes into contact with terminal 15. Said terminal is connected to a branch 16, connected to plate 17. Said plate 17 has a companion plate 18 working therewith, but normally separated therefrom. A branch 19 extends from plate 18 and connects with a line 20, which line is connected at one end to the receiver 21 and at its opposite end to a contact member or plate 22. The opposite side of the receiver is connected to the line 6 through line 23. 24 indicates the contact-plate for the coin, and is connected by 25 to transmitter 26, to the main line *a* through line 27. Line 25 is likewise provided with a branch 28, which is connected to the swinging plate 13 or the arm 14 carried thereby.

A second electromagnet 29 is employed, being connected to the line 2 by a branch 30, and a branch 31, terminating in a contact 32, is connected with the opposite end of coil 29. Contact 32 works in conjunction with a key 33, which in turn is connected to the line 6 by the branch 34.

The telephone-casing D has upon its inner face a coinway E, the upper end of which is in line with a coin slot formed in the upper shelf of the casing. The coinway extends laterally from the opening formed in the casing and terminates in a vertical chute F, at the lower end of which are placed the coin-contact members 22 and 24. The inner wall of F is cut away to permit the nose of a gravitating lever G to extend therein, the upper end of said lever being weighted, as at H, to cause the nose to drop inwardly into the coinway. This lever, while permitting the coin to readily pass down by it, precludes the withdrawal of a coin. After passing down the way F the coin rests upon the upper side of the receiver-hook A, the upper side of said hook A being formed with a bevel I, which inclines outwardly toward a channel J, leading to the outside of the machine. A second way M is placed upon the opposite side of the receiver-hook and is in line with an opening N, which opening delivers the coin to a box O.

The end of the bar or rod 36 stands normally in the coinway J and prevents the coin from passing down to the outside receptacle or shelf L until said rod is withdrawn from the coinway.

The receiver hook or arm A carries a cam P, the function of which is to return the pivoted plate 13 at certain times to its normal position, where it may be engaged by the hook or nose 12.

Extending up from the telephone-casing is a spring-arm Q, provided with a laterally-projecting pin or finger R, which stands in line with the inclined face or cam P. When the receiver is released from the hook the cam-face P will pass upwardly and bear against that side of the finger R adjacent to the plate 13, thereby forcing the spring-arm away from the plate 13. Upon the downward movement of the hook when the receiver is hung up the cam-face will act on finger R, swinging it and arm Q inwardly and causing arm Q to swing the pivoted plate 13 back, so that the hook 12 may engage the same.

With the parts in the position shown in Fig. 1 and assuming that it is desired by the central office to call up the subscriber the current passes over line *a*, through line 2, contacts 4 and 4^a, line 3, ringer 5, and thence through line 6 to main line *b*. The current also passes through line 7, energizes the electromagnet 8, causes the plate 13 to drop, and then passes through line 9 to the line 6. The dropping of the plate, as before stated, completes the circuit, closing the contact between the members 14 and 15, and as the subscriber lifts the receiver from the hook the circuit is completed through the transmitter and receiver by member C, passing in between the members 17 and 18. The talking-circuit is then over line *a*, line 27, transmitter 26, line 25, line 28, member 14, through contact 15, line 16, plate 17, member C, plate 18, lines 19 and 20, receiver 21, line 23, line 6, back to the main line *b*. The central office can communicate with the subscriber without the deposit of a coin. Assuming, however, that the instrument shown is being used by the party calling, the subscriber will notify the central office by lifting the receiver from the hook, which opens the contact 4^a, and causes the signal at the central station to indicate that the subscriber is calling. Upon the deposit of a coin the circuit will be completed through line *a*, line 27, transmitter 26, line 25, contact 24, the coin, contact 22, line 20, receiver 21, line 23, line 6 to line *b*. The central office will then call the party desired. The receiver-hook A will then be in the position in Fig. 2, and the coin will occupy the position shown in Fig. 2; but as soon as the receiver is hung up the arm or hook will be depressed, and the coin will pass into the way M, down through opening N, and into the box O, being prevented from taking the other course by reason of bar or rod 36 standing in its way. Should the central operator, however, not be able to reach the person desired, then by sending a current over the line and the subscriber likewise depressing the key 33 the circuit will be completed through line *a*, line 2, branch 30, coil or electromagnet 29, branch 31, contacts 32 and 33, branch 34, line 6, back to line *b*. By reason of the electromagnet 29 being energized the end of the bar or rod 36 will be withdrawn from out of the path of the coin, permitting it to pass down into the channel J to the outside shelf. The return of the coin is under the joint control of the central operator and the subscriber and the coin cannot be withdrawn by the subscriber until the central office sends a current over the line and the subscriber at the same time closes the pay back key 33.

Fig. 5.

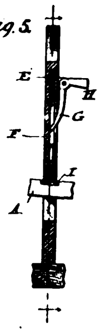


Fig. 2.

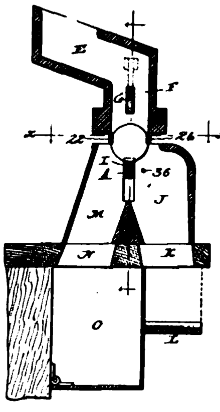


Fig. 4.

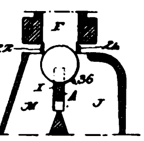


Fig. 3.

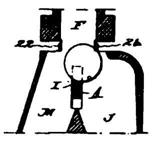


Fig. 6

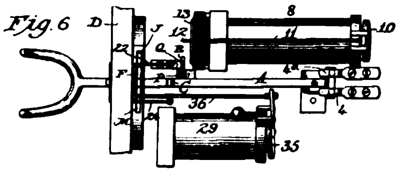
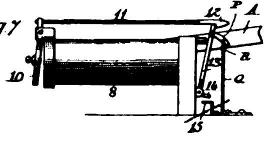


Fig. 7



The Week's Messages.

NEW COMPANIES

SARATOGA, CAL.—The committee on local telephone, appointed at the last Improvement Club meeting, reports about twenty-five who are anxious to form a company and subscribe the necessary amount to immediately establish a local system. A constitution has been prepared and will be submitted to a meeting of the subscribers, when officers will be elected and all matters of immediate import will be discussed. The committee is composed of R. Husted, J. L. Pendleton and Rev. C. L. Peterson. Efforts have been made time and again to get satisfactory terms from the Sunset Company, but their exorbitant rates have made terms impossible.

WAYNESBORO, GA.—The Waynesboro Strowger Telephone Company has been incorporated with a capital stock of $6,000. W. E. Jones has been elected president.

ST. ANTHONY, IDAHO.—The Jackson Hole and Teton valleys will have telephone connections by spring. A telephone line from Jackson through the Basin to St. Anthony is to be built by Eastern capitalists. The name of the concern is the Teton Telephone Company.

SALEM, IND.—Patrons of the Cairo Telephone Company have reached a decision whereby they have formed a co-operative system of their own and one entirely Independent of any other company. The company will be known as the Salem Co-operative Company. Several meetings have been held by the members of the company and organization has been perfected by the election of the following officers: J. E. Kolb, president; Arch Pearson, vice-president; W. K. Pierce, secretary; F. M. Buskirk, treasurer. K. B. Vencill, general manager of the company, is encouraged over the prospects of the new organization and says the interest manifested on every side augurs well for its success.

SULPHUR SPRINGS, IND.—The Sulphur Springs Co-operation Telephone Company has been organized. The shares are valued at $35 each. The company elected nine directors: R. A. Mann, Asa Maddy, Jonathan Huffman, D. F. Hoover, John McSherly, Joe McWilliams, George Fleming and Henry Fadley.

ELDRIDGE, IA.—The Eldridge Mutual Telephone Company has been incorporated with a capital stock of $10,000, of which $700 is to be paid up before business can be commenced. Shares are to be of a par value of $35 each. The officers of the incorporation as named in the articles are: J. H. Wiese, president; Henry Gertz, vice-president; M. H. Calderwood, secretary, and H. W. Bruhn, treasurer. The other incorporators of the company are Gus. Schneckloth, George Stoltenberg, August Krambeck, C. O. Munter and E. M. Burmeister.

LA PORTE, IA.—The Wettstein Construction Company, of La Porte, has been incorporated. The company is capitalized at $100,000 and is for the purpose of constructing and maintaining telephone lines in this and other counties. Officers: President, Otto Wettstein, Jr.; Vice-President, N. J. Wettstein; Secretary, C. E. Tilton; Treasurer, Otto Wettstein, Jr.

BOYDS, MD.—The United Telegraph and Telephone Company will build a trunk line from here to Westminster in the early spring, with central office here. Metallic circuit will be installed.

FOREST CITY, MO.—The Great Northern Telephone Company, of Forest City, has filed articles of incorporation, with capital stock of $25,000.

COKATO, MINN.—The Cokato Telephone Company has organized here with a capital stock of $10,000.

ALBUQUERQUE, N. M.—George A Kaseman, Fred Fornoff and J. B. Fish, of Albuquerque, and William C. Reid, of Las Vegas, have filed incorporation papers for the Central New Mexico Telephone Company. The company will construct, operate and maintain telephone and telegraph lines for public and private. The principal office for business will be located in Albuquerque. The capital stock is $10,000, divided into 200 shares at $50 each.

COLUMBUS, OHIO.—The Muskingum Valley Telephone Company, of Morgan County, has been incorporated with a capital stock of $5,000.

STOUT, OKLA.—The Stout Telephone Company, of Stout, Washita County, has been incorporated with $10,000 capital stock. Incorporators: W. H., S. M. and George Auxier and W. A. Verdier.

CROSS ROADS, PA.—A charter has been issued to the York Southern Telephone Company, of Cross Roads Borough, York County, with a capital stock of $1,000. Treasurer, S. O. Smith, Cross Roads; directors, Archie Hyson, Wilben; J. R. W. Keesey, Stewartstown; C. T. Grove, Felton; O. G. Curran, Cross Roads; Frank Kurtz, Rinely; D. W. Breneman, Cross Roads.

FINANCIAL.

LOS ANGELES, CAL.—The Home Telephone and Telegraph Company has filed its certificate of bonded indebtedness to the amount of $3,500,000. The $1,000 bonds bear 5 per cent. interest and are to run thirty years.

ST. PAUL, MINN.—About forty of the 140 telephone companies in the State have reported their gross earnings for 1901 to the State Treasurer. Those reporting are all small companies from the rural districts, but their returns show an increase of about 20 per cent. in the earnings over those of 1901.

ST. PAUL, MINN.—The Northwestern and Twin City telephone companies have paid to the State Treasurer their 3 per cent. gross earnings taxes for 1902. The Northwestern Company paid $25,002.89 on total receipts, reported at $833,429.92. The Twin City Company paid $5,553 on total receipts reported as $185,111.66. Last year the Northwestern paid a tax of $23,332 and the Twin City $1,507.45.

ST. PAUL, MINN.—The price of the 7 per cent. preferred stock of the Twin City Telephone Company is to be advanced to 105. E. H. Moulton is president.

NIAGARA FALLS, N. Y.—A consent given by the stockholders of the Niagara County Home Telephone Company to give a mortgage for $500,000 to the Empire State Trust Company has been filed at the county clerk's office in Lockport.

WHITEVILLE, N. C.—The Columbus Telephone Company, with headquarters here, has increased its capital stock from $10,000 to $20,000.

CLEVELAND, O.—At a meeting of the directors of the Federal Telephone Company arrangements were made for the payment of the Cuyahoga Telephone bonds interest amounting to $55,000 and the deferred bond interest of the United States Telephone Company amounting to $45,000 due July 1 last. The action taken in arranging for the payment of over $100,000 in back interest is regarded as extremely significant of the future of the properties affected. It regard to the matter President Dickson, of the Federal Company, said, "The action of the directors signifies that the properties will be taken care of and that money will be put in for the improvements necessary to make the properties most effective and put them upon the best possible paying basis. The action taken in regard to the Cuyahoga and United States Telephone Company will apply similarly to all properties of the Federal Company. If the intention was to let the matters go the bondholders could have foreclosed through a non-payment of interest." Because of the absence of Henry Everett no other action was taken at the meeting.

NASHVILLE, TENN.—The capital stock of the Cumberland Telephone and Telegraph Company will probably be increaesd from $10,000,000 to $20,000,000 at a meeting of the stockholders to be held on Dec. 29. The Board of Directors has declared the regular quarterly dividend of 1¾ per cent. to all stockholders of record on Dec. 20, the dividend to be paid on Jan. 2. Th stock books will close with the close of business on Dec. 19 and will reopen on Jan. 2.

ELECTIONS.

SHOOFLY, IA.—The Shoofly Telephone Company, at a recent meeting, re-elected the following officers: President, J. J. McDermitt; Secretary and Treasurer, I. M. Pricket.

CHARLOTTE, MICH.—The officers for the Eaton County Telephone Company for the ensuing year are as follows: Richard Bohn, president;

THE WEEK'S MESSAGES Continued.

Jacob Upright, vice-president; Fred C. Colb, secretary; E. T. Church, treasurer. These officers and George Williams, Jerry Mikesell, Hezekiah Woodworth and C. E. Chappell are the directors.

FRANKFORT, N. Y.—At the annual meeting of the Frankfort, East and West Schuyler Telephone Company the following officers were elected: W. E. Goodwin, president; S. P. Johnson, vice-president; E. J. Ladd, secretary and treasurer; Howard March, member of executive committee. Each member was assessed $2 for running expenses during the year.

LIBERTY, N. Y.—At the annual meeting of the stockholders of the Delaware River Telegraph and Telephone Company, held at Liberty, the following directors were chosen for the ensuing term: Herman S. Wells, M. Eugene Clark, William C. Rose, Oora C. Wells, William D. Cunningham, David S. Avery and Alfred N. Knapp.

BELLEVUE, OHIO.—A few changes have been made among the officers of the Local Telephone Company. At a meeting of the directors held recently J. F. Laning, of Norwalk, resigned the presidency of the company and C. R. Callaghan, who was vice-president, was elected president and will also retain the position of general manager. W. M. Halliday was elected vice-president and Sol. M. Wolf was elected director to succeed Ford Laning. No other changes were made in the directorate. F. A. Knapp retains the secretaryship and A. M. Beattie, of Norwalk, will remain treasurer of the company. The affairs of the company are in a prosperous condition and a number of extensions and improvements are being made at the various exchanges.

MENNO, S. D.—At a meeting of the stockholders of the Menno, Moland and Norway Telephone Company these officers were elected: Dr. H. M. Clagett, president; Christopher Mass, vice-president; J. S. Headley, secretary; Edward Myhre, treasurer. Directors: J. H. Mettler, Hans Mosby, T. Aukland.

ST. ALBANS, VT.—The annual meeting of the Franklin County Telephone Company was held here recently. The report of the manager showed a large increase in business and 160 new subscribers for the year. A dividend of 10 per cent. was declared. It was voted to increase the capital stock of the company as extensions and improvements might demand. The following officers were elected for the ensuing year: J. H. Abbott, president; S. W. Flinn, vice-president; M. P. Abbott, secretary and treasurer; V. P. Abbott, auditor, and A. C. S. Beeman and A. H. Abbott, directors.

FRANCHISES.

LOS ANGELES, CAL.—Application has been made to the supervisors by the United States Long Distance Telephone Company for a general franchise for the construction of telephone lines throughout Los Angeles County.

KANKAKEE, ILL.—The mayor has signed the franchise granted to the Inter-State Telephone Company.

QUINCY, ILL.—C. M. Irwin, of Macomb, representing the Western Illinois Telephone Company, has asked the city council for a franchise to construct and operate a telephone system in this city.

MINNEAPOLIS, MINN.—The committee on underground wires has reported favorably to the council on the franchise asked for by the Twin City Telephone Company.

COMPETITION.

HAMBURG, PA.—The Consolidated Telephone Company, the rival of the Pennsylvania Telephone Company, has opened its exchange here with thirty subscribers. An equal number has subscribed at Kutztown and Boyertown.

COMBINATIONS.

FORT WAYNE, IND.—The Independent telephone exchange at North Baltimore, which was owned by Fort Wayne capitalists, has been sold to Charles Wyant, of Toledo, Ohio, for $5,000.

PONTIAC, MICH.—The Oakland Telephone Company, of this city, has purchased the exchange of the Oxford Telephone Company at Oxford. Walter Knox, of this city, has been elected president of the Oxford Company and A. F. Newbery, of Rochester, secretary.

HEMPSTEAD, L. I., N. Y.—The Long Island Telephone Company has purchased the South Shore Telephone Company. Paul E. DeFere, of 666 St. Marks avenue, Brooklyn, is at the head of the new company, which has not yet been incorporated. The principal office will be located here. The entire system of the South Shore Company will be torn down and a new system built.

UNDERGROUND.

COUNCIL BLUFFS, IA.—A petition urging the passage of the ordinance providing for the placing of all telephone wires in underground conduits, signed by over 100 of the leading business and professional men of the city, was presented at a meeting of the city council recently. The ordinance was informally discussed by the aldermen in committee of the whole, but no action taken.

CONSTRUCTION.

McCRORY, ARK.—Sheriff Marshall Patterson, of this place, is constructing quite an extensive system of telephone lines, with the central office here. His lines run to Fair Oaks and Wynne, Augusta and Bald Knob, Cotton Plant and Hunter.

MENDOTA, ILL.—The Bureau County Independent Telephone Company expects to construct lines into LaSalle and Peru early in 1903.

STERLING, ILL.—The Interstate Telephone Company will rebuild all of its county lines outside of here. An exchange is to be installed at Coleta and one at Tampico. A line is to be built to Prophetstown by way of Lyndon and exchanges will be built at both places.

FORT WAYNE, IND.—At a meeting of the Electrical Investment Company here, Theodore Thorward, president of the South Bend Home Telephone Company, was instructed to secure figures for another section to the South Bend switchboard. This will allow for the installation of 2,100 telephones.

NEW CASTLE, IND.—The New Castle Telephone Company is constructing a line into Lewisville and has nearly finished one to Ashland. A party line will be strung west of town. The company now has 400 telephones in operation in the city and about 1,800 in the county.

DURHAM, IA.—The Farmers Mutual Telephone Company has its line extended to this place. More lines will be put in shortly.

MIDLAND, IA.—The Midland Telephone Company will build an exchange in Terril.

LA CROSSE, KANS.—The La Crosse Telephone Company is making arrangements to install a new, 100-drop manual switchboard by the first of the new year. The service of the town is now an old automatic system and is not satisfactory. By the change the number of subscribers will be about doubled. La Crosse now has toll line connections with the surrounding towns supplied by the Rock Telephone Company.

LOUISVILLE, KY.—The Eureka Telephone Company, an organization composed of farmers of Boone, Heth and Washington townships in Harrison County, Ind., is extending its lines into Posey and Taylor townships and will soon connect with the system in Corydon and thence with Louisville. This company now has over 100 telephones in service.

BOYDS, MD.—The United Telegraph and Telephone Company, which recently bought out the telephone lines in this section of county and Washington, Frederick and Carroll counties and owns a large system in Pennsylvania, will build a trunk line from Boyd's to Westminster in the early spring. The central office is to be left here, and a number of branch lines will be run to it, the system to be put under metallic circuit.

GRAND RAPIDS, MICH.—C. E. Tarte and Albert Stacey, of the Citizens' Telephone Company, have returned from Jackson, where they went to consult the officials of the Citizens' Company, of that place, regarding contemplated extensions. The local officials are highly pleased with the business the Jackson Company is doing, and state that the people of the community are strongly in favor of the new company. The Jackson exchange has 1,100 telephones now in service, with more than 100 orders ahead, and expects to increase its service to 1,600 within the next few months. New cables will be laid at once in the downtown district, to take care of the increased business. No switchboard extensions are needed at present, as the board now in use is equipped for 1,600 telephones, with an ultimate of 3,000.

HEBRON, NEB.—A new telephone system is to be installed here, a franchise having been granted to W. G. Francis, of Kansas City, and C. M. McNeill, of Beatrice, who have formed the Home Telephone Company.

CLINTON, N. J.—The Merchants' and Fermers' Telephone and Telegraph Company has made connections with Clinton. It is expected that the line will soon be in operation to Annandale, Lebanon and Whitehouse. It is now connected with Milford, Frenchtown, Bloomsbury, Pattenburg, Little York, Mt. Pleasant, Everittstown, Pittstown, Quakertown, Baptisttown, Croton, Stockton, Sergeantsville, Ringoes, Rosemont, Idell, Lambertville and some other smaller places. The intention is to make connections, as soon as the weather will permit, with all parts of the county.

ELIZABETH, N. J.—The Hudson and Middlesex Telephone Company is advertising for bids for the construction of a line that will include Cartaret, Woodbridge and Perth Amboy.

BOLIVAR, N. Y.—The Bolivar Telephone Company is extending its lines up Pleasant Valley from Richburg.

EAST ROCKAWAY, L. I., N. Y.—Lawrence Stiles, of this place, is chief construction engineer for an Independent telephone company which is now making arrangements for constructing lines in Suffolk County, N. Y.

NEW LISBON, N. Y—An extension of the New Lisbon Farm Telephone Company's lines from Mt. Vision by the way of Bowe Hill and Edson Cor-

THE WEEK'S MESSAGES Concluded.

ners to Milford is being agitated. If sufficient interest is shown by those who reside along the proposed route, the line will undoutbedly be built next summer. The company now has about 35 miles of line in fine working order, with over 100 telephones in use, from Mt. Vision to Lena, Welcome, Garrattsville and Edmeston. The stock is in shares of $10 each and no one is permitted to subscribe for more than ten shares nor to be a stockholder unless he rents a telephone. The rent of a telephone with free use of the entire line is $5 per year, the line and instruments being kept in repair by the company, which has been incorporated under the laws of the State of New York. John Gregory, of Welcome, N. Y., is the manager of the company.

PULASKI, N. Y.—The construction of the proposed new telephone line from Pulaski to Oswego by the Ontario Telephone Company will not be started until early spring. It is understood that the company's line, which has been completed from Oswego to Phoenix, will be extended to Syracuse also in the spring.

LANCASTER, PA.—The United Telephone and Telegraph Company will begin work shortly on a new line to be erected between Lancaster and Landisville. Communication with Landisville is at present had by the way of Columbia.

TOWANDA, PA.—The Bradford County Telephone Company, with headquarters here, is preparing to extend its lines to connect through to Wilkesbarre, Scranton and other points south. Lines will also be constructed westward to Canton and Troy connecting with the proposed long distance westward to Canton and Troy connecting with the proposed long distanced lines of the York State Telephone Company. It will also soon be building from Elmira to Williamsport. The Bradford County Company is meeting with much success, the farmers in Bradford County being particularly interested in the system.

ALEXANDRIA, VA.—Several members of the Woodlawn Farmers' Club, of Lower Fairfax County, met in this city recently and discussed the advisability of constructing a telephone line between Alexandria and Accotink.

MARSHFIELD, VT.—The Molly's Falls Telephone Line will within a few days have connection with the new People's line from Plainfield to Orange, Corinth, Bradford and other places in that section.

WARRENTOWN, VA.—The Warrentown and Upper Fauquier Telephone Company is rapidly pushing forward the completion of its new line, and all that now remains to be done is the stringing of the wire.

MARTINSBURG, W. VA.—The Winchester Telephone Company is rebuilding its entire system. Most of the wires will be cabled.

GREEN BAY, WIS.—Green Bay business men are organizing a local Independent telephone company to furnish service to this town. A line connecting this place with Appleton will also be built.

LA CROSSE, WIS.—C. A. Sterling, of the Northern Construction Company, has secured a contract for $50,000 of telephone improvements in Austin, Minn. The company will install a new central energy underground telephone system which will cost $50,000.

MISCELLANEOUS.

WILMINGTON, DEL.—The Delmarvia Telephone Company, of this city, which operates an Independent system here, expects to connect with the Keystone Company, of Philadelphia. When work on the connecting lines is completed the Independent companies will have a trunk line from Philadelphia to Baltimore, with branches in other places.

NORMAL, ILL.—The Home Telephone Company has installed a new switchboard in its exchange here to accommodate another 100 lines.

LAFAYETTE, IND.—Telephonic communication between residents of Lafayette and members of the Stockwell co-operative system has been established. The local connection was made through the Lafayette Telephone Company's exchange.

DES MOINES, IA.—It is understood that the Mutual Telephone Company directors will agree upon a programme for reorganization the coming week, to be carried out at the annual meeting in January. The devisement of a plan has been left to F. M. Hubbell and J. D. Whisenand. Mr. Hubbell holds $20,000 of interest bearing bonds of the company and his son, F. C. Hubbell, who will return from Honolulu the coming week, is president of the company. Mr. Whisenand is a director.

CHARLEROI, PA.—The Monongahela Valley Telephone Company has made a traffic agreement with the Federal Telephone Company whereby the service of the Federal Company is extended to Rices Landing, Merrittstown and Masontown and it is expected that Morgantown will be connected in the near future.

ERIE, TENN.—The Houston County Telephone Company has completed a new line up Well's Creek. The company has within the past two years extended its lines from a small local exchange to almost every part of the county and has made arrangements for connection with local companies in adjoining counties.

TRADE NOTES

The F. Bissell Company, Toledo, Ohio, has published a chart for cable boxes showing accurately all the wire numbers on ten arms. The card is five and one-half by ten and one-half inches and was designed by C. E. Nicholas, manager of the Kenton, Ohio, Home Telephone Company. The company will take pleasure in mailing cards upon request.

The Gordon Battery Company's exhibit attracted a great deal of attention at the recent Inter-State Convention in Chicago. E. M. Deems, the company's western agent, was in charge. The Gordan cell is so extensively used throughout the country for operating central energy systems and switchboard transmitters and has given such universal satisfaction that it has gained a large number of staunch friends among the telephone fraternity. Gordan cells are made in different sizes varying in capacity from 100 to 1,000 ampere hours. A constant current, depending on the type, at an E. M. F. of from 65-100 to 75-100 volt can be obtained from this cell and as there is practically no internal resistance, the E. M. F. is available. The cell is free from noxious fumes and gasses and is not affected by climatic changes. It requires no attention during its life and is not consumed by local action when not in service. The home office of the Gordon Battery Company is 439-445 East 144th street, New York. Its western office is located at 358 Dearborn street, Chicago. The company now has in preparation an enlarged catalogue fully describing the different sizes of the cell which it will be glad to send upon request.

PLANTS FOR SALE

Advertisements under this head* $1.00 *for* 25 *words or less for each insertion. Prepaid.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

INVESTMENT OPPORTUNITY.—Telephone plant, 1 year old, 195 subscribers, 85 miles toll lines in booming town, 4,000; connections with Independent long-distance lines in view. Good reason for selling out. Address A, care of AMERICAN TELEPHONE JOURNAL, N. Y.

WANTED

Advertisements under this head,* 25 *cents for* 25 *words or less for each insertion. Prepaid.

FORMER assistant exchange manager in charge of 2,900 subscribers, New York City, is open for position. Age 29, technical graduate, broad business experience. Address R. A. D., care THE AMERICAN TELEPHONE JOURNAL, N. Y.

WANTED—Sober, reliable young man as superintendent of 200 subscriber plant and outside work. Must be thoroughly competent in switchboard and instrument work of magneto and common battery system; hustler, capable of maintaining plant to highest efficiency, and know how to get best work from employes. Address, stating experience, references and salary expected, TELEPHONE, Lock Box 93, Elizabeth City, N. C.

POSITION WANTED by strictly temperate man, 25 years old, with seven years' experience in Independent and Bell systems. Experienced in all branches of work. References from former and present employers. South preferred. Address EXPERIENCE, care AMERICAN TELEPHONE JOURNAL, New York.

I WANT the exclusive handling of an account, for Chicago trade, beginning January 1st. Manufacturers' Agency basis. Address SALESMAN, care AMERICAN TELEPHONE JOURNAL, Monadnock Building, Chicago.

The American Telephone Journal

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SOME STEPS IN THE EVOLUTION OF CIRCUIT DESIGNS ARTICLE VI.—THE TRUNK CIRCUIT ON THE SELF-RESTORING DROP SYSTEM

By J. C. Kelsey

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IN the process of rebuilding a telephone exchange, one office is often completed before the others, necessitating such a design of trunk circuits between offices as will operate under one set of conditions at one end and under a different set at the other. For example: Suppose that the old *Main* office was equipped originally as Series Grounded Board, and has now been rebuilt to operate upon the self-restoring metallic system, while some or all of the *Branch* offices still use grounded circuits. Assume, also, that there is sufficient business to justify the use of the *Reversed Call Circuit System* of *Trunks*. By this method of trunking two sets of trunk lines are provided between each pair of offices, one for outgoing messages and one for incoming. In the example there would be one set of trunks extending from the Main Office to each Branch Office and another set of trunks extending from each Branch Office to the Main Office. The trunks from the Main Office to the Branch Office are called *in* the Main Office "outgoing trunks," and would be there multipled in a set of jacks in front of each subscriber's or "A" operator. Upon this set of trunks all the messages transmitted *from* the Main Office *to* the Branch Office would be carried. Each trunk would terminate in a plug in front of an incoming trunk, or "B" operator, in the Branch Office, and are there called "incoming trunks." Conversely, from each Branch Office there would be a set of trunks multipled in jacks placed before the "A" operators there that would extend *to* the Main Office and there terminate in plugs appearing before "B" operators. These trunks would carry all the messages going *from* the Branch Office *to* the Main Office. Such trunk line circuits are illustrated in Figures 32 and 33. Fig. 32 shows outgoing trunk lines, starting from multiple jacks in the Main Office and becoming incoming trunk lines ending in plugs appearing in a "B" position in the Branch Office. While Fig. 33 indicates outgoing trunk lines, running from multiple jacks in the Branch Office, and becoming incoming trunk lines ending in plugs in front of the "B" operator in the Main Office. Fig. 34 is the assembled drawing, showing the entire trunking system. On the left-hand side of Main Office is represented 1, 2, 3, 4 and 5, indicating the "A" operator's positions, in each of which there is a multiple jack, bridged across the trunk line D that extends to the Branch Office, and there ends in a plug on the incoming trunk position B. The Branch Office is represented on the right hand 1, 2, 3, 4 and 5, indicating the "A" operator's positions, in each of which is a multiple jack, to the trunk line C that extends to the Main Office and there appears as a plug in the incoming trunk position B.

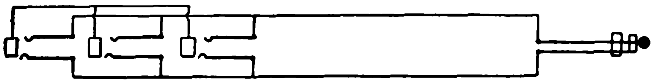

FIG. 32.

Outgoing trunk multiple jacks in main exchange.

Trunk line ending in plug, appearing in a "B" position in branch exchange.

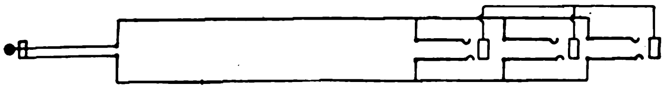

FIG. 33.

Trunk line ending in a plug in a "B" position in main exchange.

Outgoing trunk multiple jacks in branch exchange.

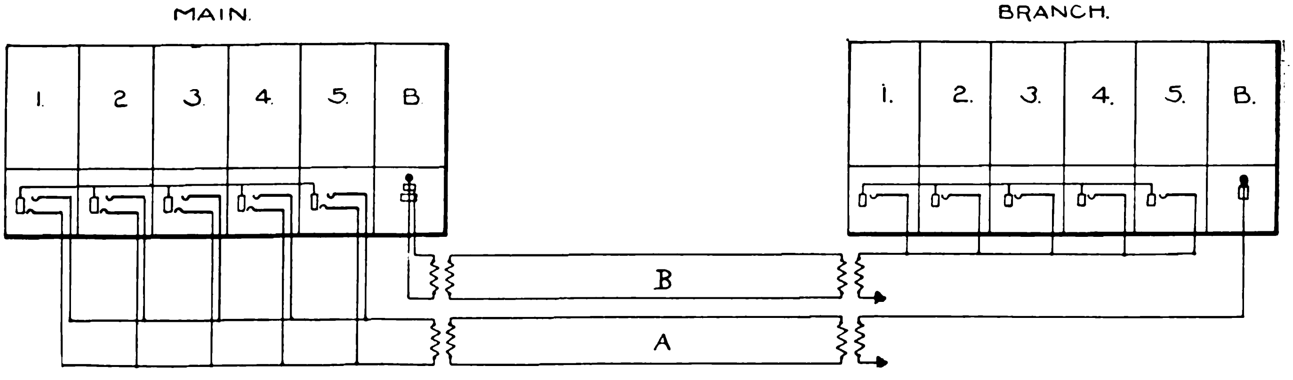

FIG. 34.

In addition to these sets of trunk lines, each "A" operator in the Main Office has access to certain special wires called "call circuits," that extend to the receivers of "B" operators in every other office. By means of a key the "A" operator can bridge her telephone set across the call wire, and can thus speak directly to the ear to any "B" operator she desires to reach. Similarly each branch office "A" operator can reach a call wire to the Main Office "B" operator. Suppose an "A" operator receives a subscriber's order for No. 552 in branch office, the "A" operator presses the button of the call wire leading to the receiver of the

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Editor's Note.—The first article of this series appeared in the issue of November 29. They will continue for many months.

"B" operator before whom 552 appears, and says 552. As the trunk lines from the Main Office appear in front of this "B" operator ending in plugs, she knows at a glance which trunk lines are in use and which are free; taking up the plug of any disengaged trunk line, she speaks into her transmitter which is now connected with the receiver of the "A" operator transmitting the order, and says, for example, 16. The "A" operator is thus informed of the number of the trunk line which she is to use, and she inserts the connecting plug, of the pair of cords, answering plug of which is already in the jack of the calling subscriber, into trunk jack No. 16.

Ordinarily, the outgoing and incoming trunks are of the same design, but in the case at hand one system is a grounded one and the other a metallic with self-restoring drops. The outgoing trunk in the Main Office has a different style of jack from those in the Branch Office, and the incoming terminals have different styles of keys and plugs. Yet the operating features are the same, and the same rules of disconnection are observed. As soon as a "B" operator has rung a desired subscriber, she pays no more attention until notified by "A" to pull down. This notification is given by a magnetic signal, which receives its energy from the "A" end. And to further reinforce the rule that "B" will not disconnect until ordered to do so by "A," the clearing-out drop is dispensed with, taking away from "B" any possible temptation to pull down the connection. If the party called by the "B" operator does ring off, only the "A" operator knows it, because she has the only clearing out drop. Ascertaining that the conversation is finished "A" withdraws the plugs. The magnetic signal, or disconnect, is no longer excited, and falls to normal, which "B" sees. Even the most modern trunking systems use this method of operating, only the speed is much greater.

Fig. 35 shows an outgoing trunk from the "Main," which ends in a plug as an incoming trunk at the "Branch." The rules of balance demand that a repeating coil must be interposed between dissimilar systems, and this requires that this trunk circuit have one. But some means must be taken that the entrance of the plug in the trunk jack shall put battery through the disconnect signal at "B." To put a ground on a metallic trunk would be bad, yet it is expensive to run special wires. The most convenient way is to insert another repeating coil in the trunk circuit, having one at each end of the trunk, and attach the inner middle points, using the metallic circuit as one side of another circuit, with the earth as a return.

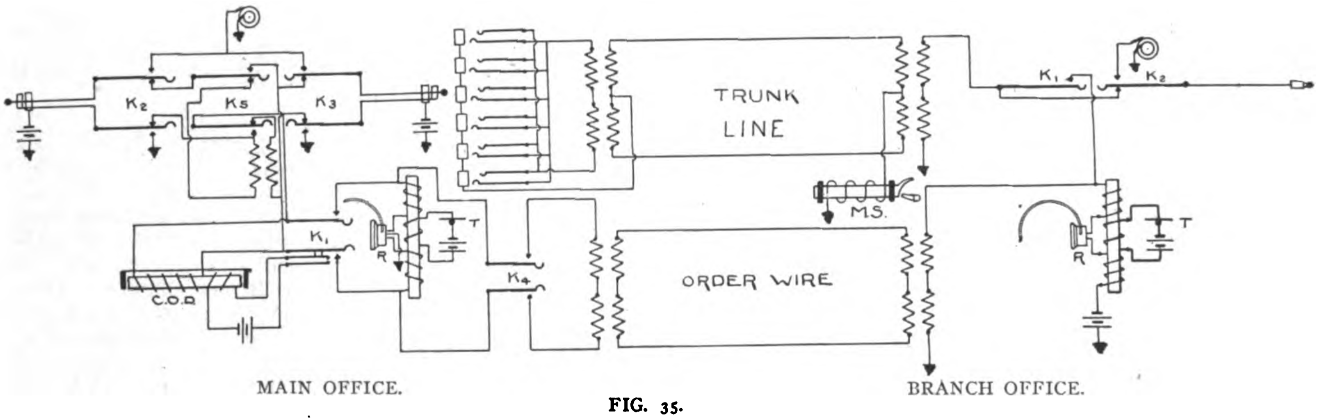

FIG. 35.

In a self-restoring drop system there exists on the sleeve of the plug a potential of eight volts. The entrance of such a plug in a trunk jack would put a potential on the sleeve of the jack which would find a path to earth through the inner middle point of coil R^1 P^1 C^1 along both sides of the metallic trunk to the inner middle point of coil R^2 P^2 C^2. From thence to the magnetic signal winding, and to earth return, thereby energizing the signal. If these two coils were built for ringing purposes, a ring off by either subscriber would thrown down "A" clearing out drop, and the operator would withdraw the plugs, removing the battery from the jack sleeves and the signal MS returning to normal.

In Fig. 36 there is an incoming trunk to "Main," which begins at "Branch" in multiple jacks. As the "Branch" is of the series system no battery exists on the sleeve, for there is no sleeve. This necessitates a pair of springs mounted on the trunk jacks and separated by a rubber bushing, which will close contacts during the entrance of the plug, and thus establish a battery potential through the magnetic signal at "B." As in the former figure, "B" has no clearing out drop, and depends entirely upon the commands of the originating operators.

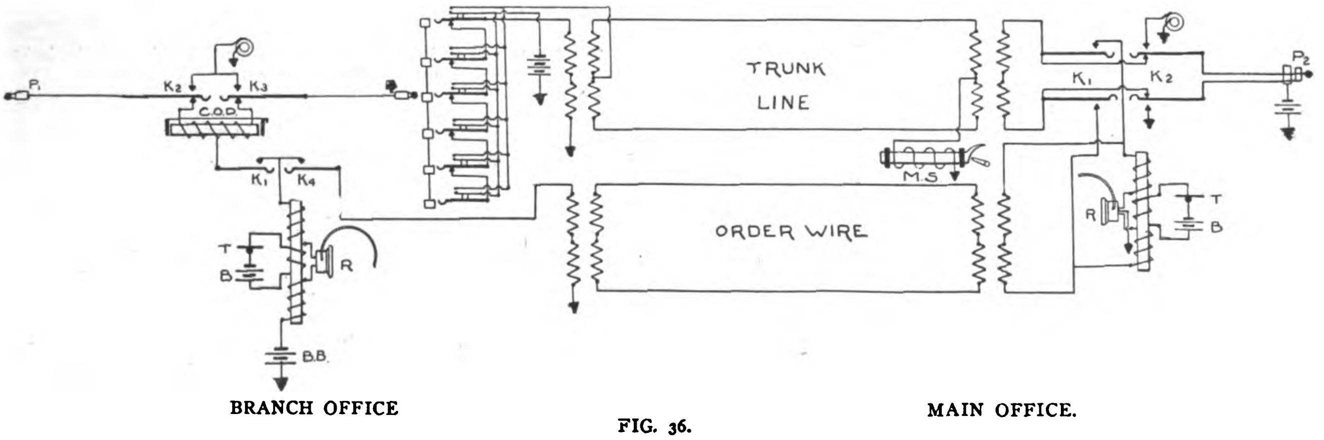

FIG. 36.

This rule of frunk operation must be observed, or endless confusion results. Not only is the "B" operator prevented from premature disconnection, but loses also the power of listening to or talking to the subscriber and sometimes even ringing subscribers.

U. S. TELEPONE CO. EARNINGS

THE UNITED STATES TELEPHONE COMPANY continues to show increased earnings. For the month of September the gross earnings were $27,005.95. The expenses and taxes were $14,659.98, leaving the net earnings at $12,345.97. The monthly bond interest is $7,770.84, leaving a surplus for stock of $4,575.13. The month of September is not one of the best months of the year; in fact, the greatest business is done from September until June, but even on this basis the earnings for a year would show about $50,000 for stock, which is 2 per cent. on the entire stock outstanding.

FOREIGN CURRENTS

By "The Arrester."

London, December 31, 1902.

THE famous Tunbridge Wells telephone case has been closed by the consent of the Postmaster-General to the sale of the municipal system to the National Telephone Company. But the National Company has not been allowed to carry out its original programme of obtaining an extended license and then absorbing the competing system that was the cause of the extension of the original license from 1911 to 1925. The consent of the Postmaster-General to the sale is given only on the condition that the National Company agrees to surrender the extended license on the date of expiration of the original license, December, 1911, and to allow the Post Office to buy such of its plant as may then be required by the Post Office at its value as plant in use at the time. There are some other conditions relating to intercommunication with the Post Office systems, to the abolition of terminal fees and to rates, which, taken altogether, render the situation of the National Telephone Company a good deal more onerous and restricted than it formerly was.

* * *

The prime object of the National Company in its purchase of the Tunbridge Wells municipal system has been to deal a blow at the general policy of municipal telephony, and judging from various notes in the English technical papers, indicating alarm on the part of those municipalities committed to a telephone undertaking and distinct hesitation on the part of others that had been considering the question, the blow has been a very effective one. The general ignorance of telephone matters is so intense that what has occurred at Tunbridge Wells can easily be used to frighten would-be telephone enthusiasts in much larger places, where the conditions and the prospects of the business are of a totally different order. Tunbridge Wells will be used in a similar manner to the "awful example" of the temperance lecturer in all arguments aimed at inducing municipal councillors to take the pledge against municipal telephony. And whatever the reasons may be, and however clear the situation might be to an expert, the facts remain that the Tunbridge Wells system has cost much more than was estimated, and that the expenses have been greater and the revenue less than was estimated. As the municipalities necessarily have to be guided in all their preliminary plans entirely by estimates, and these estimates are all prepared by the same expert who made those depended on at Tunbridge Wells, these facts can be used very effectively in throwing cold water on proposed municipal telephone competition.

* * *

The expert whose estimates for Tunbridge Wells have been so harshly criticised by his former employers wrote a letter of protest to the Postmaster-General, which has been published in most of the papers. Mr. Bennett says: "I deny most emphatically that the prices estimated were inadequate, for they were in all cases calculated to afford a liberal margin; and the causes of the loan proving inadequate must be sought in the policy of expansion which was at first adopted by the Telephone Committee—a policy which no doubt would be amply justified by results were it given time to mature. Contributing causes, and very material ones, were also the substitution of small underground cable for the overhead wires which were originally estimated for, for which change I was in no way responsible, and in wayleave difficulties which led to much of the work being reconstructed several times over. In none of these matters had I a controlling voice, and it would be as logical to expect an engineer to build two miles of railway at the cost of one as to hold my estimates responsible for what has happened. The undertaking so far has not shown any loss, and the loss which is expected to occur next year is extremely small, and would not take place at all if reasonable prudence were exercised in the management, which has not hitherto been the case."

* * *

After dealing with some matters of detail that have no general interest, Mr. Bennett indulges in a little *tu quoque* argument, as follows: "Notwithstanding the increase in the capital cost, the telephone department of the corporation is in a solvent condition, and with careful management would certainly pay its way without any increase on the present tariff. The Post Office telephone undertaking in London is only in its first year of working. Large sums have been expended in anticipation of future wants, a circumstance that makes its case parallel with that of the Tunbridge Wells and Glasgow Corporation undertakings. If, sir, the Post Office telephone exchange were burdened in this, its first year of existence, with full interest and sinking fund in the way in which the Tunbridge Wells enterprise has been burdened, an enormous loss would have to be confessed to, although no reasonable doubt could exist as to the ultimate success of the enterprise if persisted in. Yet we do not hear of any public clamor to have the Post Office system sold to the National Telephone Company; but if there is any sense or justice in the view taken by the Tunbridge Wells Town Council, public meetings ought to be held all over the country to insist on the immediate transfer of the Post Office undertaking at a ruinous sacrifice."

* * *

The inference that this last suggestion is apparently intended to convey is hardly justified, as, so far from there being any ruinous sacrifice in the sale of the Tunbridge Wells system, the agreement with the National Telephone Company, according to all accounts, safeguards the corporation from any loss whatever. The amount guaranteed by the company is actually much in excess of what the plant is worth, although, as already pointed out, the company has got a good return for the obligation incurred in the moral effect of its anti-municipal bomb. Nor is there really a very close parallel between the Post Office London system and that of Tunbridge Wells, as the conditions are so entirely different. But in the main Mr. Bennett's contentions are fair and reasonable, and he puts his finger on the very difficulties that seem bound to bring to grief any telephone system planned on the lines adopted at Tunbridge Wells.

* * *

The whole affair is a striking illustration of the absurdity of government control of a business that is much better left to private enterprise. The existence of government control, with all its useless and cumbersome restrictions, leads to the attempt to do business in an unbusinesslike way, an attempt that is certain to result in failure. The English municipal authorities are doubly handicapped in taking up the telephone business, as they not only have to submit to all the restrictions imposed by the Post Office license, but they also have to satisfy another government department that there is no danger of incurring a loss that would fall on the rates before they can obtain authority for raising the capital by issuing a loan. It is this that leads to the cheeseparing estimates of the cost of construction and operation that are made out to show that a commercial success is assured, and are upset, as in the case of Tunbridge Wells, by contingencies liable to occur in any telephone system, and by conditions such as the impossibility of ever completely filling up a telephone plant and the necessity for constant expansion, that are not properly contingencies at all, but well understood features of the business.

* * *

As Mr. Bennett points out in his letter quoted above, a policy of expansion would no doubt be amply justified by results were it given time to mature. In point of fact a policy of expansion is an absolutely necessary policy in a successful telephone business. But it is a policy that can successfully be carried out only by a concern having a free hand. A company is not bound to spread its whole business scheme on a public record, as is a municipal department, in order to obtain each installment of a few thousand dollars of capital. Nor is a company tied by all sorts of restrictions and regulations regarding rates and methods. The history of the Tunbridge Wells case shows what can be done in the way of telephone development where there is active canvassing and competition. In a very short time the number of telephones in the district was raised from under 200 to nearly 2,000. If the corporation system had been in the hands of a company having a free hand and an energetic management, the outcome of the competition would probably have been very different.

TELEPHONE CIRCUITS.—ARTICLE VI.

By H. P. Clausen

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FIG. 215 is a simple two-way single lever switch, while Fig. 216 is a two-lever double throw pole changing switch. Figs. 217 and 218 represent standards, one a single break and the other a double break automatic circuit breaker. Current passing through the electro-magnet immediately above the retaining catch of the breaking switch causes the circuit to be opened the moment the trip catch is drawn up into contact with the magnet. Fig. 219 shows a simple double lever double throw switch with one of the circuits connected, while Fig. 220 is the same switch with the connections standing open.

ORDER BUTTONS.

Figs. 221, 222 and 223 show well-known forms of order buttons and require no particular description except the suggestion that Fig. 223 shows a possible combination that may be made in springs. Figs. 224, 225, and 226 show standards which have been adopted by some draughtsmen as the diagrams representing the approximate mechanical construction and mounting of the apparatus.

SWITCH-HOOKS.

Fig. 227 shows a simple form of switch-hook, while Fig. 228 shows the same construction with a slightly different arrangement of the contacts. In Fig. 227, in its normal position the switch-hook makes connection with the lower contact and when passed upward, makes contacts with two normally opened upper connections. In Fig. 228 the normally closed lower contact is opened and two normally opened contacts closed without the body of the switch-hook forming a part of the circuit. Fig. 229 gives the construction of a contact produced by the switch-hook when traveling from its normal position to its operative position. The switch-hook is provided with a roller insulated from the frame and so disposed towards an auxiliary spring as to force the auxiliary spring to make contact momentarily with a normally opened front contact, but restoring the normally closed back contact immediately after.

CIRCUIT CONNECTIONS.

In order to show how some of the different standards appear connected up in combination Fig. 230 gives a connection between a transmitter and a receiver, while Figs. 231 and 232 respectively show the connections between a switchboard transmitter and receiver. In Figs. 233, 234 and 235 the same transmitter and receiver are shown with the addition of a battery, while Fig. 236, 237 and 238 show the connections of a local battery equipment using different transmitters but similar induction coils, receivers and batteries.

Editor's Note.—The first article of this series appeared in the issue of November 22. They will continue for about one year.

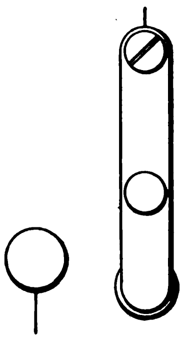
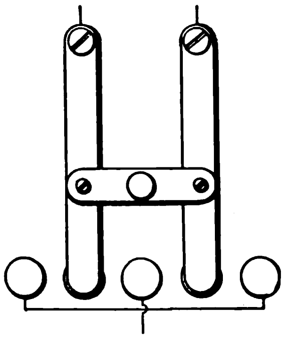


FIG. 215.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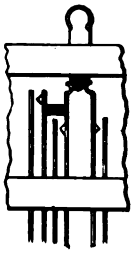
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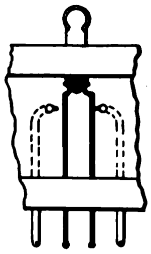
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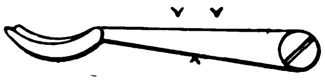
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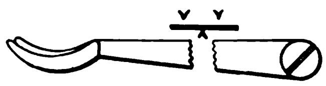
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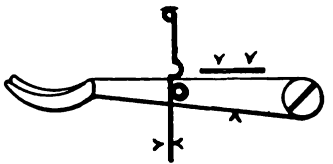
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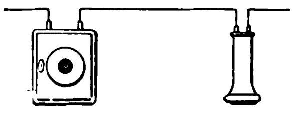
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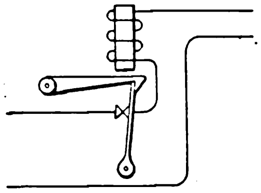
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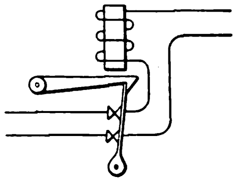
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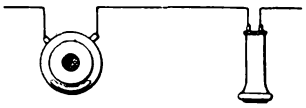
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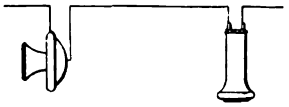
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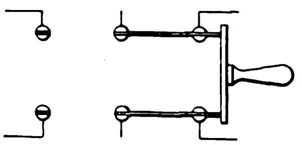
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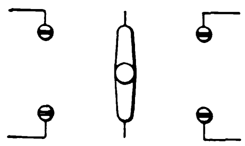
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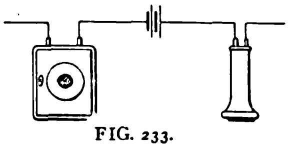
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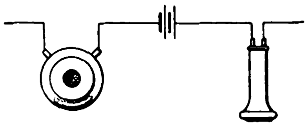
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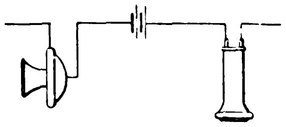
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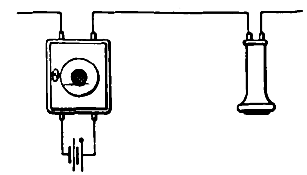
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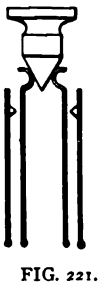
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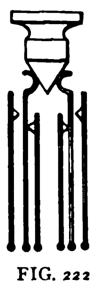
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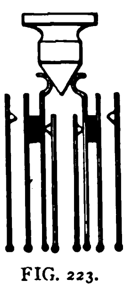
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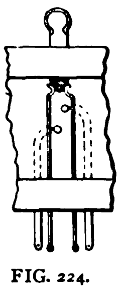
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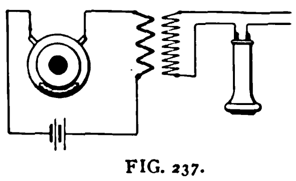
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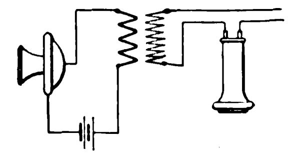


FIG. 238.

CONTEMPORARY CROSS TALK

By *"The Listening Key."*

THERE is no doubt that if proper steps are taken systematically to educate telephone subscribers in the proper use of the service, in the best way of operating their stations and in a due observance of telephone etiquette, a substantial reduction can be made in the time occupied by the average local message. Any such measures must, of course, be accompanied by the smartest kind of operating at the exchanges. Improvements can be made in the quickness of the exchange operating, and are well worth trying for, as every second or fraction of a second gained in operating the average connection has a cumulative effect on the efficiency of the whole plant. Moreover, it is unreasonable to expect the subscribers to display great efficiency or to take special pains to cure themselves of their evil habits if they are not met with the very top-notch of quick and accurate operating at the exchange end of the line. However, it is hardly necessary to insist upon this point, for any superintendent or manager who is sufficiently broad-minded to realize the importance of educating his subscribers and is a sufficiently good administrator to carry out the work systematically will also be a type of telephone man that will know how to secure and maintain high efficiency in his operating staff. There are too few telephone managers who thoroughly train and supervise even the inside operating force; but even when this is done the work of obtaining a quick and efficient service is only one-third accomplished. In the average connection there are two subscriber operators to one telephone operator, and the best results are obtained only if all three are well trained.

* * *

Some time back, in discussing the different ways in which the time occupied by the average local message could be reduced, it was hinted that a certain amount of help would come automatically, as it were, from without. To put this into a plain proposition, it may be expected, as the development of the telephone service extends, that the average message, while requiring to be carried over a gradually increasing distance, will tend to become shorter and to occupy less time. This is entirely apart from the gain in time that will be derived from greater expertness and more businesslike and correct operating and talking on the part of the subscriber. There is undoubtedly a tendency on the part of the actual telephone message to become gradually shorter; that is, the tendency is for the short message to arise in greater number than the long message, and consequently the time of the average message tends constantly to decrease. This is an entirely natural process, a certain result of the increasing use of the telephone service and of its lessening cost. The same effect may be observed both with letters and with telegrams. As facilities increase and rates go down, vast quantities of short and relatively unimportant messages take to the mails and the wires that at higher rates would not be sent at all.

* * *

In dealing with this point, a very close parallel cannot be drawn between letters and telegrams and telephone messages, because the classes of service rendered are very different. No telephone service in a place of any size nowadays is complete if it gives a purely local service only. A toll service and a long distance service are necessary, because the public is getting more and more to depend on the telephone service for communication over all distances, by reason both of its quickness and of the completeness of the communication, which gives message and reply in one operation. But notwithstanding this, the fact remains that by far the greater proportion of the day's work of a city telephone system is in local messages. The suburban and long distance services are necessary adjuncts; they are profitable and they are growing in importance daily, and they give facilities that are absolutely demanded by the public, but it is probably not an overestimate to say that at least ninety-five per cent. of the day's traffic of a local telephone system consists of local messages. This fact alone sharply differentiates the telephone service from the postal or telegraph service.

* * *

The telephone service, then, being used principally for local messages, it can readily be seen that there are few points of comparison, except on general lines, between telephone and telegraph and postal traffic. Telephone messages deal with one's hourly needs and affairs, and although on occasions a written message may be preferable to a spoken one, it may safely be said that if everybody had a telephone nobody would ever send a local telegram and few would write a local letter. The fact that telephone messages are mainly local—nine out of ten of them—and deal with one's hourly needs and affairs, is what leads one to expect that the average telephone message will grow shorter as the service becomes more widely developed. This will be because the telephone will be used very much more for simple enquiries and for direct orders that require merely an acknowledgment or a concise answer of the "yes" or "no" variety than it is at present. Just as the use of the telephone service is mainly for local communications, so will the number of short messages increase with the cheapening of the service and the spread of its use among all classes of the community.

* * *

No very deep or detailed analysis of telephone traffic is required to prove this point. It must be a matter of common observation that as the telephone service becomes more widely developed and its use becomes easier, owing to improved equipment and smarter operating, it is very much more largely availed of than formerly, for simple enquiries and direct orders that occupy the wire very little time, but are of great value to the telephone user. For example, it is within everyone's experience frequently to be called up by somebody who merely wants to know if you are in or will be in at a certain hour. Such an enquiry and the reply do not occupy the line thirty seconds. With a dear and badly developed service people cannot afford to use the telephone for the purpose of such simple enquiries. If the service is inefficient, slow, inaccurate and hard to use, people of impatient disposition will not undergo the trouble and annoyance of getting a connection for the purpose of making such a simple enquiry. But if the service is cheap and widely developed, and is also so efficient as to be easy to use and certain to give a quick result, we all know that there will be many such short messages of enquiry.

* * *

There is a whole family of messages of this kind which it is needless to particularize, as they will readily occur to anyone who uses the telephone much or has watched its development closely. They are growing rapidly in numbers, and will continue to grow as the development of the service continues to bring all the inhabitants of a town in close touch with one another. Messages of this class do not occupy the line for more than about thirty seconds, often less than that, and the increase of such short messages must certainly bring down the average time occupied by the local message. Another class of short message is the simple order. The increasing use of the telephone service in private residences gives rise to a large number of these short messages. In private residences the telephone is largely used for messages that occupy the plant for but a very short space of time—orders for cabs and carriages, for express companies to call, for household supplies that require very little description, hurry calls for the doctor, and so on. True, residence telephones are often used for long private conversations, but the short messages, simple orders and enquiries predominate now, and are on the increase; they no doubt far exceed in number the abnormally long messages of a purely social or family nature.

* * *

The growth in number of the short message is encouraged by three factors—the excellence of the service, its cheapness, and its development. The service must be easy to use—quick, clear and good—or people will not be encouraged to use it for the simple affairs of everyday life, for their *hourly* needs. If I am not sure when I go to the telephone of getting an immediate response to my call, a quick and accurate connection and good talking when connected, I am very apt to avoid the use of the telephone as much as possible. If, on the other hand, I am thoroughly accustomed to a most efficient service, I am encouraged to use the telephone for every little thing, and I am tempted to think up ways of using it, and to think of it first of all whenever I need communication with anyone for any purpose. That cheapness encourages the generous use of the service of course goes without saying, and naturally cheap rates especially encourage the short message; if rates are high, there is a natural hesitation about using the telephone for simple enquiries and orders, and a slower and cheaper method of communication will be used.

FEDERAL TELEPHONE PLANS

THE directors of the Federal Telephone Company held a meeting recently in the office of President Dickson, and considered the report upon the various properties submitted by the president. The meeting was well attended, and those present were satisfied that the telephone properties were being well taken care of and that the telephone finances would be straightened out within a short time. President Dickson's report showed that three of the companies were not earning their bond interest, but would be able to do so with the expenditure of a little more money and the raising of rates. He estimated that the total money needed to be expended on the subsidiary companies during the year 1903 for the complete development of the various plants was $551,179.38, of which amount $36,000 will be required for the month of January. This latter amount was provided and the promise made that all of the former amount would be secured as fast as needed. The report also showed that the main difficulty with the Federal Telephone property is not because the company has bad telephone properties, but because it has purchased an interest in too many telephone properties for the amount of money it had and that the whole assets of the company had been in danger of being wiped out by reason of the debts of the company. It was stated that had the company purchased $4,000,000 less of telephone property the Federal Telephone Company would now be out of debt and would be paying good dividends on a proportionately smaller capitalization. It was also stated that the surplus earnings of the subsidiary companies of the Federal Telephone Company were at the present time sufficient to pay 2 per cent. upon the entire capital stock of the Federal if it was available. The Federal Telephone Company owes in round numbers about $3,800,000, and there is due it from the various subsidiary companies in round numbers about $800,000. The Federal owns bonds of subsidiary companies to the extent in round numbers of about $1,800,000, and it owns stock to the par value of nearly $6,000,000. If these bonds could be sold together with a certain percentage of the stocks in each company not necessary to the Federal to retain control, the Federal would be able to pay its debts and retain enough stocks to pay a dividend on Federal Telephone stock.

E. W. Moore, of the Everett-Moore syndicate, is now working on a plan to pay the Federal Telephone debts and to furnish the necessary money for improvements. One plan suggested is the collateral trust plan. Another plan which is said to be favored is printed below. This plan is in rough shape yet, but may be submitted to the stockholders of the Federal Telephone Company early in the year. It is deemed advisable to have the Federal retain controlling interest in the various subsidiary companies, and for this reason a reorganization will be effected. This plan proposes the organization of a new company, which will be known as the United States Telephone Company of New Jersey. This company, like the Federal, will have a combined capital stock of $10,000,000, divided as follows: $2,500,000 first preferred 6 per cent. accumulative, $2,500,000 second preferred non-cumulative, $5,000,000 common. Of the first preferred but $1,500,000 is to be issued, which will be sold at par, netting to the Federal Company the sum of $1,500,000. These securities are to be offered to the stockholders of the Federal Telephone Company on the following basis: For each 100 shares of Federal Telephone stock the owner will be offered fifteen shares of first preferred 6 per cent. cumulative, for which he will pay for, receiving in addition twenty-five shares of second preferred and fifty shares of the new common. This really amounts to an assessment of $15 a share on the present Federal stock. Of the $1,500,000 which will be realized from the sale of the new stock, $500,000 will be used for the new improvements and for development work as outlined in President Dickson's report, and $1,000,000 will go towards paying certain debts which will release $1,600,000 of bonds. These bonds will also be used to pay debts, and it is believed that with the $2,600,000 of indebtedness thus out of the way that the balance can be paid with the money due from the subsidiary companies of the Federal and from other sources, completely paying the Federal's debt and leaving it as assets practically all of the stock which it now owns except some few lots which may be sold in order to clean up the indebtedness as mentioned before.

This entire proposition, if it is to be adopted by the company, will be underwritten by the Everett-Moore syndicate. The exact condition of affairs in connection with this proposition is not obtainable at the present time, but it is said that from data and other tables which the syndicate has, it is known that there will be no difficulty in paying the dividend on the first preferred stock besides leaving a large surplus for second preferred and common, and that as the property will be out of debt and a growing one, there is no doubt but that the second preferred and the common will have a considerable value in the open market.—*Finance.*

TOLEDO HOME STOCK POOLED

THE Toledo Home Telephone Company stock has been pooled and placed in charge of a voting trust for five years, in order to prevent the Bell interests or other outside interests from purchasing control of the company. The receipts for the stock may be traded in but have no voting power. The voting trust consists of the following directors: E. L. Barber, James S. Brailey, Jr., Marcus V. Barbour, M. I. Wilcox, J. K. Secor, Thomas H. Tracy, Ceilan M. Spitzer, James J. Robinson, Daniel C. Shaw, Arthur B. Taylor, Robert Hamblin, John M. Longnecker, of Dalta, Thomas H. Walbridge, George B. Boone, and Edward W. Baumgardner.

INDEPENDENT PROGRESS IN 1902

THE year just closed has been the greatest in a great many different lines in the history of the great Middle West, but in none of the lines of industry has it been greater than in the development of Independent telephone systems, says *Finance.* The growth of the Independent telephone movement the past year has been most remarkable, and from plans now under way and plans which have been made for the future, there is every indication that there will be no let-up in the development of the Independent telephone work during the year 1903.

In Cleveland the situation is not as good as it is in other cities of the great Middle West, and in the entire country for that matter, for the reason that the Independent telephone securities here have not yet recovered from the embarrassment of the Everett-Moore syndicate. There is a great amount of enthusiasm in nearly every city and State in the Union over the great movement with the exception of Cleveland. The Cuyahoga Telephone Company, however, will be taken care of during the coming year, given money to push forward its development, instead of allowing it to remain stationary as it has the past year.

In discussing the growth of the Independent telephone movement since 1895 and its present condition, Vice-President James B. Hoge, of the Federal Telephone Company, said:

"In the last four years telephone exchanges have been completed in Cleveland and Columbus, Ohio.; St. Louis, Mo.; Indianapolis and Fort Wayne, Ind.; St. Paul, Minneapolis and Duluth, Minn.; Superior and West Superior, Wis.; Grand Rapids and Bay City, Mich.; Pittsburg, Wilkinsburg, Erie and Scranton, Pa.; Wheeling and Charleston, W. Va.; Baltimore, Md.; Birmingham, Ala., and several other more or less important cities throughout the United States. During the past year exchanges have been completed, or are being built, in the following large cities: Chicago, Ill.; Philadelphia, Pa.; Buffalo and Albany, N. Y.; Toledo, Dayton, Springfield, Hamilton, Canton, Zanesville and Mansfield, Ohio; South Bend, Ind.; Louisville, Ky.; Portland and Augusta, Me.; Kansas City, Mo.; Salt Lake City, Utah; Los Angeles, San Francisco and Pasadena, Cal.; Seattle and Tacoma, Wash. This leaves but very few of the larger cities of the United States to be developed. The systems in these various cities now under construction, and those that have already been built, are handled principally by local capital, which insures to those companies local support that cannot be competed with by any foreign corporation."

Few people who are not following the situation closely appreciate the growth that the Independent movement is having over the entire country. The large Independent manufacturers are not only furnishing equipment for the United States, but are also furnishing a large amount of equipment for foreign countries, and it will be but a short time until the development of an Independent character will be such as will make the system as complete, as far as the operation of same is concerned, as the Postal Telegraph Company's system is in comparison with the Western Union, and the Independent will be by far the stronger of the two organizations. This is illustrated by the number of telephones in use to-day by the two systems in Ohio, Indiana and Michigan, where the Independents have developed the field quite generally, with the exception of Detroit, Mich., and Cincinnati, Ohio, where they give the Bell Telephone Company the benefit of the large number of telephones they have in the two cities, and yet the Bell had June 1, 1902, but 163,430 in the three States as compared with 205,375 operated by the Independents.

A LARGE ILLINOIS RURAL SYSTEM

THE Eppards Point Telephone Company, of Ocoya, Ill., is the largest telephone association in Livingston county, in that State. It has 121 telephones, ten country lines and six private ones. There are also direct lines to Weston, Fairbury, Chenoa and McDowell, besides connections to all other neighboring places. N. J. Myer is the president, E. B. Earnhart is the secretary and W. E. Fisk is the treasurer. The company was organized last spring and the central office at Ocoya was put in last September. There is an all-day service and also a very good night service, besides four hours Sunday, when the line can be used for ordinary communication, although in cases of sickness or distress they are available at any time during Sunday.

INDEPENDENT ACTIVITY IN IOWA

THE fact that the new telephone system in this city and in the cities across the river are nearing completion and will be in operation before many more weeks pass, has set people to thinking about the convenience the rural connections will be to the merchants and the farmers, says the Davenport, (Ia.) *Republican*. The Independent line is being welcomed by the people of surrounding towns quite as much as in the three cities where the central offices will be. All the Independent companies in towns for fifty miles around are preparing to connect up at the earliest possible date. Maquoketa is to have a toll line to connect with the new system in Davenport. The poles for the connection with the Johnson county system have been put in to the western limits of the city for several months and only the stringing of the wires remains to be done.

For three weeks past the Maquoketa Telephone Company has been working a gang of fifteen to eighteen men and teams between Lost Nation and Dixon in Scott county, and in a few days will have completed eighteen miles of very substantial toll line. This, by mutual arrangement of several Independent companies, is to be made a trunk long distance toll line between Dubuque and Davenport and will be equipped with copper wires. In fact, it is intended to make it so good that three pairs of wires will be required to do the business.

The DeWitt Independent Telephone Company has some 250 instruments installed and quite largely among the farmers. It places no instruments in the country for less than $18 per year. In a few days the DeWitt lines will be placed in direct connection with the Maquoketa Independent system at Bryant, Welton and probably Charlotte. Heretofore connections have been made with DeWitt by way of Clinton, a line usually crowded with work during the middle of the day.

It is said that the new company in the three cities will pay an annual rental of over $1,000 for the privilege of running its cables across one of the bridges over the Mississippi.

RATES TO BE RAISED BY CUYAHOGA

IT is understood on very good authority that the officials of the Cuyahoga Telephone Company are figuring on changing their prices for telephone service within a very short time says *Finance*. It was originally intended to wait until the new city administration came into power and ask the administration for permission to make the changes, as the present administration has no power to grant anything of the kind. The officials of the company, as well as many prominent attorneys of the city are of the opinion that the city has no right to say what prices the telephone company shall charge and that any such contract between the city and the telephone company is void. Recent decisions of the court have been along this line. In case the company takes this action, which it believes necessary to be taken, in order to protect the property, most of the rates will be cheaper than the present rates. It is intended to raise the full metallic circuit rate from $36 for residences and $48 for business to something like $44 for residences and $60 for business. A four party line service will then be given at something like $18 a year, for which service the Bell now charge $24 a year. If these changes are made it is believed that the company will be able to earn enough money to put the property in splendid condition financially and to make a 4 per cent. showing for the stock after charging off a considerable sum for depreciation.

CANNOT BE REFUSED SERVICE

OFFICIALS of the Citizens' Telephone Company of Grand Rapids say that if the statement is true that the Bell Telephone Company refused long distance service to a person at Newburn, whom it was claimed owed them money, when payment had been tendered for the desired service, the company, under the laws of this State, was liable to revocation of its charter.

"This case as reported," said Secretary Fisher recently, "is similar to one we had several years ago. It occurred at Northport and the man wanted connection with Grand Rapids, if I remember correctly. He was in bad standing with the company, owing us for service for some time back, and so unsuccessful were we in securing payment we took his telephone out and refused to give him further service until he paid up in full. In pursuance of this mandate, we refused him service over the long distance line, and he promptly called the attention of the attorney general's office to the matter.

"We believed we were acting well within our rights, when we received word from the attorney general that we must give this man service or anybody else, when they applied and tendered the money, or our charter would be annulled. We gave the service very promptly, and have never since attempted to enforce payment of back bills by this method. As I understand the ruling of the attorney general in that case, we were placed on the plane of a common carrier and have no more right to refuse service to anyone than has a railroad company or any other corporation which has been granted special privileges."

EVERETT TO BUY STARK COUNTY COMPANY

IT is reported on pretty good authority that Henry A. Everett is figuring on buying the Federal Telephone Company's control of the Stark County Telephone Company. Other capitalists have made a bid for this property, and it is said that Mr. Everett will take the property at the figure they offered. The sale of this particular property would do considerable towards clearing up the Federal situation and provide for its financing. The Stark Telephone Company has in operation exchanges in Canton and Alliance and is building exchanges in other towns in Stark county. It has in operation at the present time about 2,000 telephones. It has capital stock issued to the amount of about $500,000 and outstanding bonds to the amount of $350,000.

OPINION AND COMMENT

INDEPENDENT telephone men should be able to use with much profit, the recent statement issued by the American Telephone and Telegraph Company. We consider the figures sufficiently interesting to reproduce them entire; but even more interesting is the inspired paragraph attached to the report which was given out at Boston, on December 30th. It furnishes the key-note to the general idea that obtains in the Bell management, and if the general public could only be enlightened in the matter, considerable aid would be given to the Independent movement everywhere.

"As a matter of fact," this paragraph runs, "the officials of the company (the American Bell) would be glad to see a cessation of the very large increases. New instruments mean more money spent in installing them, and we should be glad to add to the total revenue without spending so much in increasing the number of instruments in use, or to get our second wind, as it were."

A whole book could be no more enlightening. Throttle telephone development. Milk the few by charging extortionate rates. The whole idea of modern business is here reversed. It suggests the mediaeval business system that still prevails in certain half-civilized countries, notably in some of the Spanish-American republics and in China. There, it is not at all uncommon to find business men who discourage increased consumption, going to the extent of charging more at wholesale than they do at retail, because of the additional trouble involved in handling large orders. A similar policy boldly advocated by a modern enterprise would seem at first glance absurd, yet those who know the Bell people and their methods, will not be at all astonished at this inspired statement which is taken from the *Boston Statist* of December 31. It was this policy that succeeded so long in throttling telephone development in America, leaving this country for more than twenty years, hopelessly behind in an industry that had its origin here, and that should have shown growth beyond anything ever known.

Huge profits out of the few regardless of the general welfare, was the dominating feature from the time the Bell Telephone company was launched. Had it not been for the advent of the Independents, the art of telephony would to-day be as backward in the United States as it is in those parts of Europe where monopoly, either government or corporation, still prevails. Had telephony been a free art in America from the start, as it was, for example, in Sweden, we would have in this country probably five times as many instruments as we have to-day and the convenience to the public and the profit to the community would mount up to figures that it would be impossible to compute.

No better example of the boon that has come to the American people through the advent of the Independents can be adduced, than the statement quoted. It is typical of the Bell and the Bell policy. The only thing remarkable about it, is that its people should be so persistently stupid, as to allow such a statement to be put before the people in cold type. Everyone who is acquainted with telephony, or has had any experience with the Bell people, knows of course, that that company is controlled by men who harbor these sentiments. But there is some difference between a general knowledge, and such a cold-blooded avowal as we have heard. That the company has come out flatly with this confession of its policy, at a time when the fight is most fierce, is simply another proof of the stupidity of its officers and another proof of the fact so often asserted, that the Bell company is great, not because of merit or clever management but because of the impetus given it in the early days of its monopoly. It furnishes conclusive evidence of what may be expected in the end, for people who are so opposed to progressive modern ideas as to deplore the spread of business.

There is but one possible future. The concern that they control must die of dry rot. Here and there, sharp competition has stimulated them. In spite of themselves, they have been forced ahead in certain quarters. But where they have gained, it has been almost under protest, and to the progressive American business man, who is constantly looking ahead to the enlargement of his enterprise, there must be something almost pathetic in the struggles made by some of the Bell people against the ideas of development that have been heard here and there.

"We don't want new business. We are content with what we have got at present rates."

That statement has been heard so often by men who are seeking to promote telephone growth, that it has long ago ceased to attract attention. There have been a few isolated instances where progress in modern methods have come from within the Bell company, but almost always the men who were responsible for this were penalized in one shape or another.

The great accession of talent that has come to the Independent movement from the ranks of Bell workers, was due primarily to the fact that the Bell people have almost frowned down the progress of development. Instead of encouraging its workers to produce new ideas, it steadily applied the brake. Men who showed a tendency towards anything like enterprise, were quietly shelved. New inventions were discouraged, and where they developed in spite of this discouragement, they were bought up to be packed away in dark closets out of reach.

Improvements meant nothing more to the Bell company than the spending of money; that they also meant a great spread of business, the Bell mind was too small to realize. Small sales and large profits, that was and, as shown by the paragraph quoted, still is, the dominant Bell policy.

In spite of this, a great development has come in many places to the Bell company. But this development, as is shown, is accepted under protest in a very bad grace by the directors in Boston. Proprotionately, of course, the Independent development is tremendously greater, but in this upward and onward tendency, the Independent movement has carried the Bell people along, though they are crying out at every step against the enforced enlargement.

Here is part of the report as it was printed in the *Statist*:

Boston.—The American Telephone and Telegraph Company's monthly statement of the output of instruments for December and the fiscal year, with comparisons, follow:

December:	1902.	1901.	1900.	1899.
Gross output	84,095	92,732	63,196	53,194
Returned	33,121	34,688	23,593	23,391
Net output	50,974	58,044	39,603	29,803
Year ended Dec. 20:				
Gross output	1,078,517	960,055	618,493	661,909
Returned	453,803	386,861	281,552	206,654
Net output	624,714	573,194	336,941	455,255
Total outstanding Dec. 20	3,150,320	2,526,010	2,040,926	1,580,585

The following table shows a comparison of the gross and net instrument output by months for the past four years:

Gross output—	1902.	1901.	1900.	1899.
January	87,412	66,048	58,853	46,548
February	95,584	73,310	58,273	49,263
March	96,557	76,751	65,878	67,033
April	108,242	72,396	53,190	61,481
May	104,661	85,118	54,340	55,302
June	96,653	96,300	55,613	61,399
July	59,935	56,526	65,463	48,873
August	84,279	81,144	45,555	42,140
September	75,011	75,578	44,190	56,698
October	92,601	95,655	67,198	50,861
November	93,487	88,497	52,208	69,117
December	84,095	92,732	63,196	53,194
Total	1,078,517	960,055	683,957	661,909
Net output—				
January	52,616	40,282	39,887	31,829
February	58,729	47,166	34,858	35,787
March	53,710	39,234	45,214	53,503
April	70,655	39,219	33,113	48,402
May	72,220	47,374	30,472	34,037
June	54,912	62,079	29,942	45,731
July	25,881	26,285	35,370	30,845
August	41,245	38,147	18,345	26,751
September	31,677	42,006	13,248	36,625
October	55,446	72,281	36,461	32,817
November	56,649	60,987	15,796	49,125
December	50,974	58,044	39,603	29,803
Total	624,714	573,194	372,311	455,255

The instrument statement for the year ended Dec. 20 shows a net gain of 51,520 over 1901, or 8.9 per cent. This increase compares with 200,883, the gain shown in 1901 over the corresponding period in 1900. When asked as to the significance of the comparatively small gain, an official of the company said:

"The fact that the net gain in instruments for the year ended Dec. 20, 1902, only reflected an increase of 51,520 over that of the preceding year, is of no special significance. Telephone growth, so far as the actual number of new instruments put out is concerned, is largely fluctuating. For instance, during the year 1900, or when the Erie Telephone Company was extending its lines so extensively, the gain in the number of instruments placed was something almost disproportionate, and while the increase was maintained and a further increase was shown in 1900, it was by no means as large, or the ratio of increase so material. In 1901 again the increase assumed large figures, as is shown by the statement, which indicated a net gain over 1900 of 200,883 instruments. The fact that we have held this gain and added 51,520 more subscribers during the year just ended, is to my mind good evidence of the natural growth as against an extraordinary one."

OPINIONS OF THE JOURNAL'S READERS

FROM THE UNITED STATES ARMY.

I am directed by the Chief Signal Officers of the Army to say that this office appreciates very much the technical information appearing in your December 6th number, and we trust we shall receive this valuable journal regularly.

E. Russell,
Captain, Signal Corps, U. S. Army.

THE BEST AND LATEST INFORMATION.

The American Telephone Journal contains the best and latest information concerning the manufacturing and construction branches of the telephone field. Also contains many valuable articles of interest, describing the operation of the different branches of the industry.

F. J. Beaucond, Manager,
Home Telephone Company, New Albany, Ind.

A. T. J. ALWAYS GOOD.

The American Telephone Journal has always been good, but the Inter-State number is a hummer. George A. Bishton.
Cedar Rapids & Marion Telephone Co.,
Cedar Rapids, Iowa.

REASON TO BE PROUD.

Your issue of December 6th is one of which you have reason to be proud. This is not only true of the reading matter and advertisements, but also of the general make-up of your paper.

Kempster B. Miller.

HARD TO BEAT.

Your December 6th Inter-State number is certainly a fine one, and one hard to beat. Success to you.

Cass County Telephone Company,
Harrisonville, Mo.

THE BEST TELEPHONE MAGAZINE.

I desire to compliment you on your issue of December 6th. I think it is the best distinctively telephone magazine that ever came into our office, and I trust that you will receive such patronage as that work deserves.

R. F. Johnson, General Manager,
The Valley Telephone Company,
Saginaw, Mich.

EACH ISSUE BETTER.

It is a pleasure to me to express my appreciation of The American Telephone Journal, and especially the Inter-State issue. Each issue seems to be better than the previous one, and every one is a mine of information for the practical telephone man.

H. S. Krum, Superintendent,
People's Independent Telephone Co.,
Paducah, Ky.

ALWAYS READ FROM COVER TO COVER.

Among the several journals for which we subscribe, yours is THE ONE we always read from cover to cover. Knowing we will find all matters of interest and value, in classified and concise form, we always welcome The American Telephone Journal.

Dr. Edwin Matthews, Manager,
The Maysville Telephone Company,
Maysville, Ky.

EVERY INDEPENDENT SHOULD HAVE IT.

Practical telephone suggestions, as given by *The Listening Key*, is well worth the price of the paper alone, to say nothing of the series of papers being published on "Telephone Circuits," "Telephone Testing," "Pole Line Construction" and other topics, or the news items. It is the best paper of its kind I have ever read. Every Independent telephone man should have it, from the president of the company to the "trouble-shooter." W. S. Vivian.
Citizens' Telephone Co., Lansing, Mich.

HAS BEEN A STEADY IMPROVEMENT.

There has been a steady improvement since I began taking the Journal, about a year ago. I am sure that the trouble column will be welcomed by many like myself who have not the nerve to call themselves *real* telephone men, and are looking for information in every place possible, and this part hits us about right.

Frank Calkins,
Otsego County Telephone Co., Gaylord, Mich.

"THE BEST I HAVE EVER SEEN."

Allow me to congratulate you upon the splendid issue of The American Telephone Journal for December 6th. It is the best I have ever seen, and certainly does you great credit. Wishing you every success and thanking you for the good work you are doing in the cause of Independent telephone, I am,

Sincerely yours,
Richard Valentine, President,
Independent Telephone Asso. of Wisconsin.

INTERESTING READING.

I have read your Inter-State Number of December 6th from cover to cover, and find it very interesting reading indeed.

W. H. Hyde, Milwaukee, Wis.

LOOKS ANXIOUSLY FOR THE JOURNAL

I always look anxiously for The Journal in my mail. I cannot afford to miss a single number. Robert C. Allen,
Mount Pleasant Telephone Company,
Mount Pleasant, Iowa.

HEAD OF ELECTRICAL JOURNALS.

You are certainly advancing toward the head of the list of electrical journals at a rapid rate. C. H. Judson, General Supt.,
Twin City Telephone Company,
Minneapolis, Minn.

COMES EVERY WEEK.

I thoroughly enjoy The American Telephone Journal. It is a good newsy magazine, and fills a long-felt want, coming as it does every week. R. H. Cokefair,
Indianapolis, Ind.

NOT JUST AS GOOD, BUT——

I have read the whole of your journal for December 6th—the Inter-State Number—and am well pleased with it. I don't think it is just as good, but a good deal better, than any other trade journal published.

C. M. Turnquist,
Chicago, Ill.

MERITS ITS IMMENSE POPULARITY.

Having just read the Inter-State Number of The American Telephone Journal, I wish to say that it is by far the best publication of the kind I have ever seen. Its columns are full of matter of the greatest importance and interest to everyone identified with telephony, and the paper fully merits its immense popularity and the unqualified praise it has received.

O. C. Snider, Secretary,
Kansas City Home Telephone Company,
Kansas City, Mo.

CONTENTS ARE RICH.

Its contents are rich, and without doubt it is the best telephone journal. D. P. Tafe,
Washington, D. C.

LIKES IT BECAUSE IT IS WEEKLY.

I must say that your issue of the 6th was a surprise to me. The Journal is big and full and good and frequent. I like it because it is weekly. L. M. Neher, Manager,
Royal Telephone Company, Milford, Ind.

AT THE TOP NOTCH.

I wish to compliment you on your article, cuts, etc., of the Louisville Home Telephone plant. It is one of the best I have ever seen. It must have cost a nice little sum to get it up. It is full and complete; you have covered the field. Your journal is at top-notch.

James Maret, Secretary,
Kentucky Telephone Association.

DESERVES ITS PROSPERITY.

The American Telephone Journal certainly looks prosperous, and deserves its prosperity. Curtis-Mulford Co.,
Detroit, Mich.

COMPLIMENTS ON CLASS OF READING.

We wish to compliment you on the class of reading you have given the Independent telephone people. The various articles on testing circuits, etc., make it exceedingly valuable. The writer encloses his subscription for one year, and may the shadow of The American Telephone Journal never grow less.

Harry T. Crissey, Secretary,
The E. G. Bernard Co., Troy, N. Y.

INTERESTING AND EXCELLENT.

I have received a copy of your issue of December 6th—the Inter-State Number—and I find it very interesting, and congratulate you upon its excellence. J. W. Marsh,
Vice-President and General Manager,
Standard Underground Cable Co.,
Pittsburg, Pa.

RECOMMENDS IT TO FRIENDS.

I am in receipt of the Inter-State Number of The American Telephone Journal, and find it to contain much valuable information, and take pleasure in recommending to such of my friends as are not already subscribers the advisability of not allowing the opportunity to obtain the information given in your publication to pass. The American Telephone Journal, in this issue, as already in previous ones, not only contains valuable data which cannot fail to be of benefit and interest to the Independent telephone movement, but also contains the press dispatches as to what is being done by the various companies in this country, enabling its subscribers to be well posted as to the telephone movement in general.

Reginald F. Fennell,
Gordon Telephone Company, Charleston, S. C.

EVERY WORD WORTH READING.

I have carefully examined your Convention Number, and wish to state that I think it is the finest of its kind which has ever come to my attention. Every word in it is worth reading, and when I say this I do not except even the advertisements.

H. H. Robinson,
Assistant General Manager,
The United States Telephone Company,
Cleveland, Ohio.

EXCELLENT IN EVERY PARTICULAR.

Permit me to congratulate you on your issue of December 6th. It is excellent in every particular. F. C. Redfield,
Northeastern Telephone Company,
Portland, Me.

GOOD REASONS WHY IT IS THE BEST.

We desire to express our opinion as to the value of The American Telephone Journal to the telephone world. We think it the best telephone paper ever published, because it contains the latest ideas of the most competent telephone association (the Inter-State) in the world. We haven't before seen a telephone journal that seemed so deeply interested in the welfare of the Independent people, and we specially admire and support The Journal on the stand it takes against the "Blue Bell Monopoly." Can frankly say it is the most complete telephone and trade journal ever published. Collins Telephone Company,
Collins, Miss.

EACH NUMBER WORTH A YEAR'S SUBSCRIPTION.

I am greatly pleased with the Inter-State issue of The Journal. Each copy is well worth the price of a year's subscription. We secure a good part of our supplies from your advertisers. A. J. Newsom, President,
West Newton Telephone Company,
West Newton, Ind.

FROM HAVANA, CUBA.

You do me the honor to invite me to read over your valuable paper, The American Telephone Journal. First, I would notice the important articles that have recently been published in your paper by notable electrical engineers, in which they speak of great improvements realized in the telephone. I shall be happy to recommend it to all persons interested in telephonic subjects. The reading matter of this well edited paper is powerful and at once simple, touching all important branches of this science. Permit me to add my most sincere congratulations. Carlos Soler,
Red Telefonica de la Habana, Havana, Cuba.

PARTY LINES—SELECTIVE AND NON-SELECTIVE

By P. Kerr Higgins

THE advisability of using party lines has been a mooted question among all telephonists from the beginning of the art. That there are many drawbacks to any party line system is self-evident but there are many subscribers who are either unable or unwilling to pay the tariff charged for an individual line but to whom some telephone service is a necessity. To this extensive category of subscribers, the party line appeals directly and it is impossible for the sagacious general manager to discourage a set of patrons, which, while less desirable from some standpoints, he must either care for or exclude a large number of subscribers of an important description.

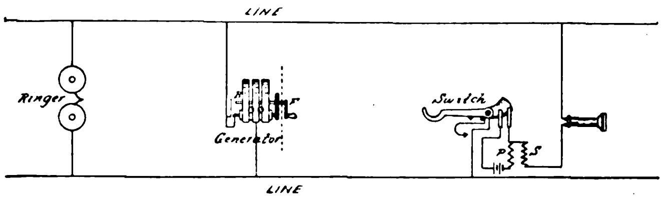
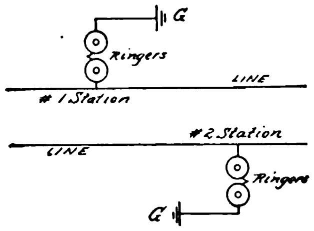


FIG. 1.—Bridging System.

One of the chief difficulties encountered in party line service lies in the attempt to put either too many parties or those whose business is excessive, on this kind of a circuit. The result is that such lines are constantly "busy." This is not only injurious to the party line subscriber by depriving him of a message that may be of importance, but is exasperating to the one calling, who quite likely is on an individual line, expecting to receive the best of service, and when met with the constant, and irritating answer of "busy," fails to remember the limitation of those subscribers less fortunately located than himself.



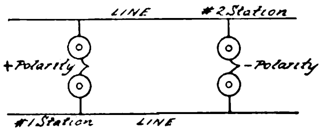


FIG. 2.—Two-party Line, Alternating Current Used to Ring on Each Side of Line.

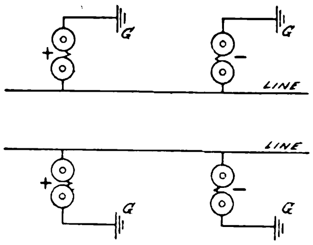
FIG. 3.—Two-party Line, Using Pulsating Current, Positive and Negative for Calling.

The best policy in such cases is to explain to the complaining subscriber that the correspondents desired are party line stations who do not receive the highest grade of service. One remedy for this difficulty is the adoption of some method whereby busy calls may be "stored" or held to wait their proper turn. Under such circumstances a calling subscriber, the line of whose desired correspondent is found to be busy, is notified of the fact and asked whether he wishes to be called as soon as the line he wishes is disengaged. While such a plan is advantageous for the subscribers, it inflicts an additional burden on the exchange, for it causes the operators more labor and necessitates some method of keeping rotational track of all calls received and making a proper connection in the order they arrive.

Some kinds of party line systems are objectionable, as the calling signals are not selective and every party is rung when any one is called. Unless careful attention is paid to the signals, and great care and ingenuity in designing them, there is constant difficulty due to wrong subscribers answering. This is vexatious, not only to all the subscribers on the line but it delays service and increases operating expenses. Further, operating is complicated as the operator must ring a varying number of times to call subscribers, and in case the subscriber does not promptly answer, a request to ring a second time is almost sure to breed errors, for the operator in the rush of switchboard manipulation, has probably forgotten which subscriber was called, and when requested to ring a second time, must either ask the calling subscriber for the number desired or court error by the certainty of calling a wrong second ring.

A third feature of many systems is the absence of a lockout arrangement and under this condition when two subscribers on the line are talking, any other subscriber may break in and overhear the conversation. To many people this is annoying and distasteful in the extreme.

The general concensus of telephonic opinion seems at present to incline to the belief that it is desirable to provide party lines with selective ringing and some form of lockout device, so when any one subscriber has gained the use of the line, others are prohibited from cutting in. The best opinion inclines to the belief that two party lines are advantageous and desirable from all standpoints; that four party lines are permissible when business is light, and that on the whole, a greater number of parties than four unquestionably is detrimental to the general welfare of the service. The number of party line circuits and devices are legion but it is not difficult to reduce them to the following four classes:



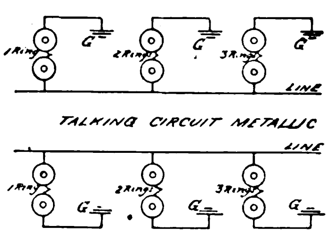


FIG. 4.—Four-party Line Selective, Two on Each Side.
FIG. 6.—Six-party Line, Semi-Selective.

First, two party; second, four party; third, six party; fourth ten party. These may be either series or bridging. The series party lines are virtually a thing of the past, and therefore are not worth considering. The patent granted to J. J. Carty, March 31, 1891, was the chief factor in the abandonment of the series system. This invention made it possible to place a number of instruments on one line without materially increasing the resistance (see Fig. 1). It will be observed that the ringer spools (1,000 ohms) are permanently bridged across the line. The generator is cut out by an automatic shunt B operated by the crank F. The secret of being able to shunt the ringer spools across the line, without materially affecting the talking efficiency, lies in the impedance created by the ringer magnets. When the line is non-selective or semi-selective, it is customary to use a strong current of low frequency. In a two party line it is not necessary to bridge the ringers. They may be connected one from each side of the line to ground, and be of high resistance (Fig. 2). If used in this way the line is fairly balanced and

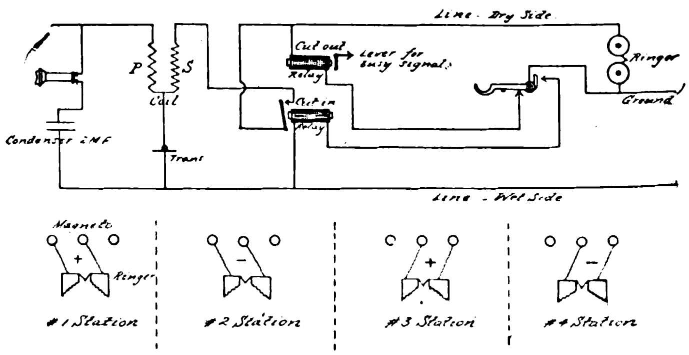


FIG. 5.—Four-party Lockout, Indicating Disk, Operated by Gravity Switch.

where a line is not full a dummy ringer can be connected to keep the best balanced conditions. The unbalance, however, is unnoticeable on short city lines, and it will seldom be found necessary to connect up the extra ringer. A service of this kind, is better than one in which the two subscribers are bridged as it is selective, only the party wanted being called, while in Fig. 1 both bells are rung at the same time. This may be overcome by polarizing one ringer positive and one negative (Fig. 3). This is best done by a tension spring on one side of the ringer armature, and the circuit arranged so that the ringers respond to + or — as may be desired. At the central office the generator armature is arranged to supply pulsating currents, positive being sent out on depressing one key and negative on another. This system can be used to make a four party selective line. by connecting two stations on each side of the line to ground. (See Fig. 4.)

This service can be further improved by using a lockout device as in Fig 5. Such lines are much used by the Bell company and give quite good results.

The six party line is usually an extension of the two party line (Fig. 6) and the ten party line is the same as the six party line extended (Fig. 7). A new method for four party line service is now being introduced and gives even better results than the polarized system. This method uses an application of currents of high and low frequency with impedance coils and condensers (Fig. 8). The ways of numbering party lines would almost fill a volume. Colors, letters of the alphabet and all kinds of numerical arrangements have been tried. The following has been found most successful. When the designatioin must indicate a given number of rings (or signals) it is best to begin party lines at a high number, say 5,000, and read first party 5,001, second 5,002, third 5,003, fourth 5,004. This shows that the number of rings, indicated by the last figure, are to be given on the 500 jack, (the jacks from 500 to 600 being reserved for party lines only). In the case of a two or a four party selective, numbers might read 500, 5,001, 5,002, 5.003, indicating the number of the station whether jack number, station 1, 2 or 3. The jack and No. 1 stations would be rung on one side of the circuit and the 2 and 3 stations on the other. In common battery systems, high resistance (say 2,500 ohms) must be used instead of 1,000 where the signalling is selective, but where the bells all ring together a 2 M. F. condenser is used in series with the ringer to prevent the flow of battery current. A novel system for party lines, designed by the Holtzer-Cabot Electric Company is shown in Fig. 9. This system uses induced currents. The diagram shows the generator in no way connected with the line. · The transformer A is specially constructed but has the usual primary and secondary winding. The primary having the highest resistance, is connected to the line and the low resistance coil to the ringing apparatus. The bell or ringer is very sensitive and of low resistance, being only 80 ohms, it is made of a short core ringer, having very little inertia. This system has many advantages and is very efficient for toll line work or private lines and may also be used to advantage in small exchanges.

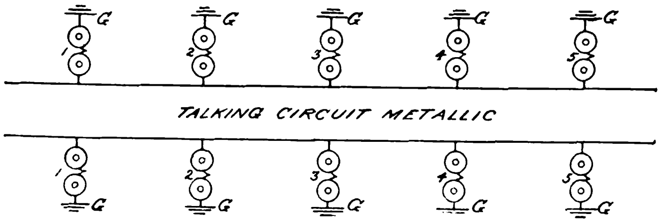


FIG. 7.—Ten-party Line, Semi-Selective.

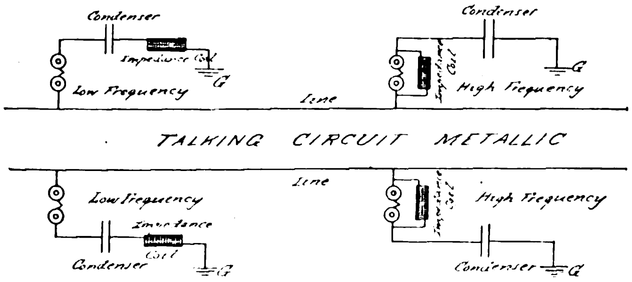


FIG. 8.—Four-party Line, High and Low Frequency System.

Lockout systems have the additional advantage of secrecy. This is desirable in that it insures more privacy and prevents interruption, so common on open lines. In Fig. 5 the circuit of such a system is shown that is quite extensively used by the Bell Company. The busy signal, as will be seen in the diagram, is operated by the central office battery in conjunction with the hook. The remaining subscribers on the line are notified on taking down the receiver of the condition of the line, the disc showing white when line is clear, and dark when busy. The method of connecting up party lines in the central office does not always receive the care it should. It must be borne in mind that on party lines the exchange signals should be about the same resistance as the ringers.

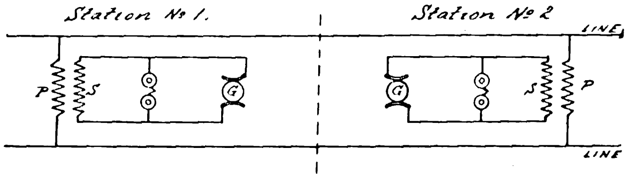


FIG. 9.—Holtzer-Cabot Party Line—Induction System.

The exchange circuits should be such as to cut out the signal during conversations in the series system but in the bridging this is not necessary, if the signal contains a high co-efficient of self-induction. It will be found advisable for all who contemplate the introduction of party lines to give the matter careful thought, obtaining all the information possible. The introduction of complicated signalling devices, cut-outs, etc., will necessitate more efficient help, increase the amount of trouble and be in no way beneficial to the service.

THE FAYETTE HOME TELEPHONE COMPANY

LEXINGTON, Ky., has an independent Telephone Company that is one of the most enterprising and up-to-date in the country. Its growth since it opened for business in May, 1901, has been remarkable. It started out with only 600 subscribers. Within a year it had tripled this number and was serving 1,800. To-day it is estimated that it has 2,500 subscribers.

This concern is the Fayette Home Telephone Company, and it also owns exchanges in several other Kentucky cities, the principal ones being at Versailles and Midway. The latest directory of the company has a page devoted to showing how its business has increased since its organization, and it is well worth reproducing.

The officers of the company are: Desha Breckinridge, president; Thomas A. Combs, vice-president; Jouett Shouse, secretary; J. Will Stoll, treasurer.

Since the first of July, 1902, Mr. J. K. Johnston has been the manager of the company. Mr. Johnston has a wide and varied experience in the telephone business, gaining most of his knowledge while with the Central Union (Bell) Telephone Company. He served first with that company as special agent and afterwards as manager.

A Wonderful Growth

July, 1901, 750 **This Diagram Illustrates**
October 31st, 1901. 1,100 **the Great Growth**
December 31st, 1901. 1,350 **of Our Business**
March 31st, 1902. 1.650 **from beginning**
July 31st, 1902. 2,000 **to present**
October 31st, 1902. 2,300 **time**
December 31st, 1902 (estimated). 2,500 **?**

FIGURES TALK LOUDER THAN WORDS
COMMENT IS UNNECESSARY
"To be continued in Our Next"

The Week's Messages.

NEW COMPANIES.

ARBUCKLE, CAL.—The farmers of Cortina Valley have joined together to build an Independent telephone line to connect them with Arbuckle. J. L. Mendenhall is the manager. When completed the line will probably be extended to Williams.

ROBINSON, ILL.—The Crawford County Mutual Telephone Company, of Robinson, has been incorporated with a capital stock of $25,000. Incorporators: D. J. Chamblin, C. W. Chamblin, L. B. Chamblin.

LINTON, IND.—Quite a number of farmers in the vicinity of Linton and elsewhere in this county, who want telephone service are discussing the question of organizing a co-operative company, the object being to connect up with line already built by the Home Telephone Company and other neighborhoods that have no telephone service. A meeting was held in this city recently to discuss measures and plans looking to the organization of such a company and an interchange of opinions brought out the fact that the majority of those present were strongly of the opinion that a general co-operative company covering the entire county and combining the several companies now operating in the county, into one complete system would be to the best interest of everybody.

SOUTH BEND, IND.—The St. Joseph Rural Telephone Company has been organized at the office of the South Bend Telephone Company. Its object is to give service in connection with the Home Company and operate in Madison and Penn Townships. A direct line will be run from here to Wakarusa. Frank W. Brown, manager of the Wakarusa Independent Telephone Company will superintend the construction of the system.

YARMOUTH, IA.—Articles of incorporation for a new rural telephone concern have been filed in the office of the county recorder of Des Moines County at Burlington. The company is called the Farmers' Mutual of Yarmouth and will operate lines in the rural districts of this county. It is backed by substantial farmers. Its capital stock is $7,000, divided into shares of $35.

PINEVILLE, KY.—The New Pineville Telephone Company has been incorporated with a capital stock of $3,600.

PORTLAND, ME.—The People's Telephone Company of New England, headquarters here, has been incorporated for the purpose of acquiring and operating telephone lines, with a capital stock of $5,000,000. President, H. Knowlton; treasurer, W. J. Knowlton, both of Portland.

BAY CITY, MICH.—Articles of incorporation of the Northeastern Telephone and Telegraph Company, of Bay City, have been filed in the office of the county clerk. The purposes of the corporation are the construction, purchase and operation of telephone, telegraph and other lines for use in the transmission of messages, and the purchase, erection, construction and maintenance of the necessary equipment, buildings and property for the operation thereof throughout the cities, towns, villages and counties of the State. The offices of the association for the transaction of business will be located in Bay City. The term of corporate existence is thirty years. The capital stock is $100,000, all subscribed, of which $30,000 is paid in. The board of directors for the management of affairs consists of George E. Dutton, Saginaw; James F. Land, Detroit; Wm. W. Jones, Toledo; O'Brien O'Donnell, Toledo; Thomas F. Hancock, Detroit.

CHEBOYGAN, MICH.—The Cheboygan Telephone Company has been incorporated with a capital stock of $30,000.

HOLLOWAY, MICH.—The Holloway Telephone Company has been incorporated with a capital stock of $1,000.

MILLINGTON, MICH.—The Millington Rural Telephone Company has been incorporated with a capital stock of $5,000.

LEBANON, N. J.—The Lebanon Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are George Clark, S. J. Shurts, E. W. Sutton and G. B. W. Tiffany, all of Lebanon. The company will immediately begin the construction of telephone and telegraph lines in Warren, Hunterdon, Somerset and Morris counties.

BUFFALO, N. Y.—The Buffalo Automatic Manufacturing Company has been incorporated with a capital stock of $5,000 by Louisa Seyfang and Lee and Henry Ephraim for the purpose of making automatic telephones.

BEAVERDAM, OHIO.—The Beaverdam Home Telephone Company has been incorporated with a capital stock of $15,000 by Edwin Fledderjohann, C. C. Heller, Allen Phillips, A. H. Heller and W. H. Fledderjohann.

RELIEF, OHIO.—The Muskingum Valley Telephone Company, of Relief has been incorporated with a capital stock of $5,000. Incorporators: Amos Lawrence, M. Fisher, E. B. Vincent, T. W. Milner, L. Baldwin and W. W. Mason.

SPARTANSBURG, PA.—The Spartansburg Telephone Company has been incorporated with a capital stock of $10,000.

CONASAUGA, TENN.—The Conasauga Telephone Company has been incorporated with a capital stock of $10,000. Incorporators: W. Morris Harrison, J. H. Card, O. L. Doty, M. E. Brient and B. F. Shelton.

MEMPHIS, TENN.—It is announced here on the authority of J. S. Warren, manager of the Memphis Telephone Company, that the Memphis Long Distance Telephone Company will be projected in a short time for the purpose of connecting with many smaller Independent lines and exchanges in this and other nearby States. The company will, it is said, have a capital stock of $100,000 and the power of issuing bonds to any amount.

HAMPTON, VA.—It is announced on excellent authority that within the next three weeks application will be made to the Hampton town council for a franchise granting another telephone company the right to construct and operate a line in Hampton. The gentlemen who are said to be behind the movement are men of means and it is understood that they intend to make a big fight to secure the desired franchise. According to a gentleman versed in the matter the company hopes to construct an underground system. The purchase of the local telephone plant by the Southern Bell Telephone and Telegraph Company has been the occasion for the organization of a new company, and it is thought the town council will grant the franchise should the new company make the prospective application.

LEGAL.

INDIANAPOLIS, IND.—Judge John H. Baker, of the Federal Court, has issued a temporary restraining order against the city of Evansville prohibiting it from interfering with the rights of the Cumberland Telephone and Telegraph Company. The hearing for the permanent injunction will be in April next. The plaintiff is a Kentucky corporation, owning and controlling 325 telephone exchanges in seven States. The Cumberland company, it is alleged, purchased the Evansville Telephone exchange in 1882 for $375,000. The Evansville exchange had a perpetual franchise from the city, but the Council in 1887 passed an ordinance making the Cumberland Company's franchise valid for only fifteen years. In August, 1902, the council passed another ordinance repealing the right of the Cumberland company to the streets and notifying it to vacate them Dec. 17. The company claims that the original franchise is still valid and the council's action is illegal. The city has subscribed nearly $200,000 for a municipal telephone plant.

FINANCIAL.

FORT WAYNE, IND.—The Gas Belt Construction Company, composed of Fort Wayne telephone capitalists, which has been in existence for less than a year, has declared a 10 per cent. dividend. The company turned over the Muncie and Alexandria Independent telephone exchanges on New Year's day to their local owners. The contract has been taken for the construction of a small exchange at Eaton and for the stringing of a new metallic circuit on the toll lines connecting the principal cities of the gas belt. The profits on the toll lines in some cases have reached 50 per cent.

WABASH, IND.—The United Telephone Company has decided to issue bonds to the amount of $500,000, and of this amount to use $100,000 to

THE WEEK'S MESSAGES—Continued.

take up indebtedness of the plant. Four hundred thousand dollars will be used for extensions and repairs. The company has plants at Huntington, Marion, Hartford City, Montpelier and Bluffton.

ARLINGTON, NEB.—The Arlington Telephone Company has voted to increase the capital stock from $5,000 to $10,000.

JERSEY CITY, N. J.—A general reorganization is going on in the affairs of the United Pneumatic Fire Alarm Telephone Company, as is evidenced by the amended articles of incorporation filed recently. The capital stock issue under former articles was $1,100,000. The authorized capital stock under the new arrangement is reduced to $50,000, which is brought about by the retirement of all the preferred stock and 9,500 shares of the common stock, leaving all the shares to be of common stock. The change in the stock issue is certified on the amended articles by President B. M. Ewing and Secretary Thomas R. Were, both of whom voted their shares in favor of the change. The other signer to the amended articles is Thomas R. Brown, who voted himself and voted as proxy for the Consolidated Fire Alarm Company and for Evans R. Dick and Max Radt.

PHILADELPHIA, PA.—The Merchants Trust Company has received deposits of the first mortgage 5 per cent. bonds of the State Telephone Company, of New Jersey. Negotiable receipts will be issued therefor under special agreement. The company was incorporated in 1898 with $1,000,000 authorized capital stock.

PROVIDENCE, R. I.—The Clark Automatic Telephone Switchboard Company, which is incorporated at $1,500,000 authorized, has recently offered a block of treasury stock for the purpose of extending its business by the organization of small local corporations to build and operate town exchanges. Officers: President, E. L. Freeman; vice-president, J. W. Phillips, treasurer, W. E. Torrey; secretary, A. S. Clarke.

JANESVILLE, WIS.—The stockholders of the Badger State Long Distance Telephone Company held a meeting here recently, and it was expected that the new company, headed by John K. Fish and Charles C. Russell, of Milwaukee, would be ready to take up the stock of the concern and wind up its affairs. The meeting was a special one, and it was thought best not to make the transfer until the regular meeting on the third Tuesday in January. The new company has secured control of 230 of the 280 shares of stock and instead of allowing the property to be foreclosed will pay its debts, bonds, etc., and vote the sale to the new corporation. The new company will be capitalized at $100,000 and will at once begin improving the property.

FRANCHISES.

SAN BERNARDINO, CAL.—The telephone franchise applied for in this county by Walker M. Campbell of the Home Telephone Company, has been ordered advertised by the supervisors. The bids will be opened Jan. 26.

BUNKER HILL, ILL.—The Macoupin County Board of Supervisors have granted the Bunker Hill Mutual Telephone Company the right to use the public highways of the county for constructing lines.

LAKE PARK, IA.—B. H. Gardner, of Vermillion, S. D., has been granted a franchise for a telephone exchange at Lake Park.

SIOUX CITY, IA.—E. H. Hubbard has been retained by a number of Independent telephone companies doing business in this vicinity to assist them in securing a franchise for a telephone exchange in Sioux City. The toll line companies that are behind the project are the Northern Telephone Company, of Fonda; Sioux Valley Telephone Company, of Cherokee; New State Telephone Company, of Jefferson, Ia.; Monona Telephone Company, of Onawa; Crawford Telephone Company, of Denison, and the Sioux City and Black Hills Telephone Company, of Ponca, Neb. The six companies reach several hundred towns, and connect with exchanges owned in towns, as well as with rural companies owned by farmers and stockmen living in the country. Mr. Hubbard says the intention of his clients is to establish a complete local exchange in Sioux City in competition with the Iowa Telephone Company. Early in January Mr. Hubbard and a committee from the toll line companies will appear before the city council and ask for a franchise for the use of the streets and alleys of Sioux City in installing their system of telephone service. It is the desire of the promoters to place the wires underground in the business district. Simultaneous with the construction of the plant in Sioux City, from seven to twelve toll lines that now reach within a few miles of Sioux City will be extended into the city to be connected with the Independent Company's local exchange. These are toll lines which have been denied traffic arrangements with the Iowa Telephone Company. The completion of the new enterprise as it is now planned will mean that over 7,000 telephones will be placed in communication with Sioux City, which now have no connection with this city.

HALLOWELL, ME.—A special meeting of the city government was held recently. The petition of the Northeastern Telephone Company was explained by the company's attorney, Thomas Leigh, and the order was passed "that all rights granted the Dirigo Telephone Company of Maine, now the Northeastern Telephone Company, by an order passed by the municipal officers of Hallowell Dec. 31, 1901, for erection of poles and cross-arms and the attaching of cables and wires thereto along and upon the several streets of Hallowell, and all rights granted said company to construct and maintain underground conduits along and in the several streets of Hallowell, for the distribution of its wires, and all rights granted said company to attach its wires to poles of other companies, are hereby extended to Jan. 1, 1904."

MEMPHIS, MO.—Joe Tall, of Kahoka, representing the Hubinger Telephone Company, of Keokuk, Ia., was in Memphis recently conferring with the city council about the granting of a telephone franchise to that company.

LANCASTER, N. Y.—The board of trustees has granted the Lancaster Telephone Company an extension of its franchise. The company has until April 1, 1903, in which to complete its system.

ELECTIONS.

SAGUACHE, COLO.—The annual meeting of the stockholders of the Saguache County Telephone Company will be held here in a short time for the purpose of electing a board of directors for the ensuing year and for the transaction of such other business as may properly come before it.

BLUFFTON, IND.—The United Telephone Company, which has authorized the issuance of $500,000 worth of improvement bonds, has elected the following directors: W. B. Cooley and A. G. Lupton, Hartford City; J. W. Sale, L. G. Davenport and Hugh Dougherty, of this city; John W. Sale, of Fort Wayne, and D. A. Breed, of Marion.

CHARLOTTE, MICH.—The Eaton County Telephone Company has elected the following officers: R. H. Bohn, president; F. C. Cobb, secretary; E. T. Church, treasurer; R. H. Bohn, F. C. Cobb, Jacob Upright, G. A. Williams, Jerrie Mikesell, Charles Chappell and Hezekiah Woodworth, directors.

WASHINGTON MILLS, N. Y.—The officers of the Washington Mills and Norwich Corners Private Telephone Company have been re-elected for the ensuing year. D. D. Prescott is president; J. D. Richards, vice-president; Chas. H. Dodge, secretary and treasurer.

COMBINATIONS.

ELMIRA, N. Y.—The control of the Elmira Telephone Company will soon pass into the hands of the York State Telephone Company, which means that the Elmira, Binghamton and Glens Falls companies are to be merged into a consolidated Independent company. No change will be made in the management, the policy or holdings of stock.

PULTENEY, N. Y.—The Pulteney, Guyanoga, and what is known as the White School House, telephone lines, have consolidated, and are now under one general management

ASHTABULA, OHIO.—The Rock Creek Telephone Company, which is now installing a plant at Rock Creek, has purchased part of the outfit of the old Ashtabula exchange, which will be thoroughly gone over and installed at Rock Creek. This exchange will start with from thirty-five to forty subscribers.

CONSTRUCTION.

LOS ANGELES, CAL.—Owing to unusual activity on the part of the Home Telephone Company the opening of that big system now is in sight. The multiple switchboard has been ordered forwarded and installation will begin about Jan. 10. It is believed that the operating room can be completed within a period of five weeks after the work begins. When ready all of the 10,658 telephone instruments subscribed for will have been placed and the system will be operated at once. Already 4,500 telephones have been put into offices in the business districts, residences being left until later. The latter will not be slighted, as the distributing system with all instruments will be in place ready for business by the time that the operators are prepared for the opening. Barring serious accidents the Home Telephone system will be in perfect order by Feb. 20. The company's office daily is flooded with additional applications for telephones.

POMONA, CAL.—The Pomona Valley Telephone Union has two solicitors in the field securing additional subscribers, the organization being ready to go ahead with work in earnest. A contract assuring connection with the Home Telephone Company of Los Angeles, has been signed, and the promoters of the concern say that Pomona will in a comparatively short time have connection with the whole Pacific coast by Independent lines.

CANTON, ILL.—A new switchboard to be placed in the local Farmers' Telephone exchange, has arrived, and it will be installed soon.

DIXON, ILL.—L. D. Pitcher has staked out the new telephone line on the Dutch road which extends from the city limits south to the Harmon and Walton line. There are ten subscribers on the line. Poles for the

THE WEEK'S MESSAGES Continued

Interstate line have arrived and will be set as soon as possible. The line extends from Chicago through Dixon, to Clinton, Iowa.

EDWARDSVILLE, ILL.—The Kinloch Telephone Company of Missouri is preparing to inaugurate an active campaign in Edwardsville. It will install a local exchange, fully equipped, and subscribers will be solicited. When the Kinloch came to town a number of long-distance telephones were installed and a small switchboard, suitable for handling them, placed. Manager Robert F. Probst announced that he has rented quarters and that a local board with two operators will be installed. He states that half a dozen applications for local telephones additional to the present service have been received, and that the company expects to get a large list.

PEORIA, ILL.—The Interstate Telephone and Telegraph Company will erect its own building for central purposes for its new Peoria system. This was agreed upon at a recent conference held in this city between President H. H. Evans, of Aurora, and E. R. Conklin, in charge of the company's construction work, after numerous propositions had been submitted to them by local property owners to rent as well as to sell property outright. The cnstruction work of the company had advanced to such a point that the location of the central station was immediately necessary in order that the work be continued.

GOSHEN, IND.—The Home Telephone Company has contracts for 400 telephones at Mishawaka, and will install the exchange service as soon as the company completes the building now being erected for its use.

MILFORD, IND.—The Royal Telephone Company is installing a town and country service with about 200 subscribers. The company uses a special party line instrument, by which patrons can call central without calling other subscribers on the line, and they can also call other parties on the same line without notifying the operator. L. M. Neher is manager.

ROCHESTER, IND.—The Rochester Telephone Company is experimenting with a device which, it is said, will increase the possibilities of party lines. It is putting in one line to accommodate forty telephones, any one of which can be called separately without disturbing the others, and all of which except the two in use can be cut out and notified by signal that the line is busy.

TERRE HAUTE, IND.—The Kinloch Telephone Company has placed its poles the entire distance from St. Louis to Indiana and the pole gangs are now near West Terre Haute. The wire stringers follow close upon the pole gangs and telephonic connection can soon be had between Terre Haute and points west over the Kinloch system.

DAVENPORT, IA.—Work is being pushed on the switchboard and the inside finishing at the new building of the Union Electric Telephone and Telegraph Company, and it is expected that the service of this company will be begun for Davenport subscribers early in February. Meantime the Independent systems in the towns nearby are preparing to connect with the exchange here and to cover the rural territory more thoroughly than in the past. The Davenport & Tipton Telephone Company is installing its switchboard at Dixon, Ia. The company's line will cover the territory between Tipton and Davenport. It now reaches Bennett, New Liberty, Dixon, Eldridge, Mt. Joy, Maysville, Plainview, Walcott, Stockton, Durant and winds up in Davenport. Its intention is to extend its line over all the rural territory possible. J. A. Klinefelter is putting in the switchboard at Dixon, having completed the one at Durant.

DEXTER, IA.—Mutual telephone exchanges are to be built at Dexter and Earlham.

OSKALOOSA, IA.—The Home Telephone Company has made a contract with a Chicago house for the installation of the ninth section of the exchange switchboard in the Oskaloosa office. The cost to the company will be something like $7,000. When completed it will give the exchange a capacity of one thousand instruments for the use of the city of Oskaloosa, exclusive of the rural and party lines. If the growth of the exchange is as rapid in the future as it has been since the property was rebuilt, some more big changes will have to be made.

PORTLAND, ME.—The organization of the Maine Construction Company has been consummated at the office of Foster & Hersey, general attorneys for the Northeastern Telephone Company. The construction company will build the exchange building of the Northeastern Company in Portland, and do other work from time to time, as the company's business is extended. The directors of the company are Edwin W. Gearhart and Thomas R. Brooks, both of Scranton, Pa., and Lewis A. Goudy, of Portland. Edwin W. Gearhart was elected president, Thomas R. Brooks treasurer, John B. Pierce, formerly of Cleveland, O., engineer and general superintendent, and Oscar H. Hersey clerk. Mr. Pierce has been in Portland for several weeks laying out the plans for the underground subway construction, and will have general supervision of the secret service automatic system, construction of which will begin just as soon as the ground will permit in the spring. Mr. Pierce has had extensive experience in the construction of some of the largest Independent telephne plants in the West, and has been selected because of his expert knowledge of such work. The Portland installation will have a conduit capacity for 5,000 telephones, which can be extended to an ultimate capacity of 10,000, with an immediate installation of 3,000, which General Manager Goudy desires and expects to obtain subscribers for during 1903 and 1904.

ELMIRA, N. Y.—A certificate for the extension of the lines of the York State Telephone Company has been filed in the County Clerk's office. The certificate states that the general points to be connected are Niagara Falls, Tonawanda, Buffalo, Dunkirk and the village of Ripley on the west and Rouse's Point, Whitehall, Lebanon Springs and Sag Harbor on the east. The capital stock of the company is given as $2,500,000. The names of the directors for the first year and the amount of stock subscribed by each is as follows: William D. Barnard, St. Davids, Pa., 167 shares; Boyd McDowell, Elmira, 167 shares; E. M. Yarnall, Philadelphia, Pa., 113 shares; Richard G. Park, Westchester, Pa., 113 shares; C. M. Clement, Sunbury, Pa., 113 shares; Edward Davis, Philadelphia, Pa., 113 shares; Ward R. Bliss, Chester, Pa., 113 shares; E. A. Scott, of Philadelphia, Pa., one share.

FRANKLINVILLE, N. Y.—F. S. Lane, of Jamestown, representing the Consolidated Telephone Company, of Buffalo, was in town recently consulting with the Franklinville Telephone Company, with the object in view of building a connecting line of the Consolidated to Franklinville. The Consolidated Company has $10,000,000 capital and is putting up strong competition to the Bell. It is now operating in Buffalo, Salamanca, Jamestown and many other places. The Arcade-Sandusky line is also interested in the new arrangement and the connection may be made soon.

FULTON, N. Y.—It is understood that the Fulton Telephone Company will construct a toll line from here to Syracuse.

MORRIS, N. Y.—At the annual meeting of the Butternut Valley Telephone Company, held here, it was voted to sell eighty shares of stock at $10 per share, for new construction. A dividend of 7 per cent. was declared. The matter of allowing farmers between Morris and Garrattsville to connect with the line at $10 a year rental of telephones and service free over the line and over the New Lisbon Farmers' line was favorably looked upon.

TONAWANDA, N. Y.—It will not be long before Tonawandans are talking with Buffalo over the Independent companies' lines. The Frontier Company of Buffalo is expected to begin operations next month and the local lines will be connected immediately. The right of way has already been selected for the toll line between here and Buffalo. The local Home system of telephones is part of the Independent Union Telephone Company's system a merger which went into effect on Jan. 1, 1903, of all the Independent lines in Niagara, Orleans and Genesee counties. The Home systems connected by toll lines under the supervision of the Independent Union Telephone Company are Akron, Batavia, Middleport, Gasport, Hartland, Johnson's Creek, Medina, Orangeport, Reynold's Basin, Shelby Basin, La Salle, Bergholtz, Wolcottsville and Priests Corner, besides Niagara Falls and Lockport. All these places will be connected with Buffalo as soon as the line between here and the Queen City is built.

BOYERTOWN, PA.—The Consolidated Telephone Company is stringing wires through town.

SPARTANSBURG, PA.—The Spartansburg Telephone Company, recently incorporated, will construct a line from here to Warren and Union City. The directors are: John K. Wright, W. E. Miller, Spartansburg, and George H. Barlow, Corry.

SWARTHMORE, PA.—The Keystone Telephone Company has a force of linemen stringing wires through the borough.

COLUMBUS, OHIO.—There is considerable talk by the officers of the Citizens' Telephone Company about the erection of a new building for the company's offices and the switchboard. The present plant is entirely too small to accommodate the business of the company and General Manager Beam has been casting about for suitable sites for a new plant..

LORAINE, OHIO.—The Black River Telephone Company, at Lorain, has just finished installing its new switchboard. The company now has in use the Sterling selective ringing system by which more than one telephone may be privately used on the same circuit. This company has 900 telephones in service, an increase of 200 during the past year, and has orders for about 300 more, which will be installed at once. The new switchboard has a capacity for 4,000 telephones, and 1,000 wires have been connected, which will accommodate considerably more than 1,000 telephones under the new selective ringing system. The company is capitalized at $100,000, with a bonded debt of $65,000. It is paying 6 per cent. on its stock.

KIMBALL, S. D.—A local exchange will be established by the Brule County Telephone Company.

PUKWANA, S. D.—The new telephone system at this place, which is being put in by James S. Sanborn, a local man, is expected to be in running order within the next two weeks. Nearly all the material has arrived and the work of constructing the system is being pushed as rapidly as possible.

MURFREESBORO, TENN.—A representative of the Independent Tele-

THE WEEK'S MESSAGES Concluded.

phone Company has been in this city looking over the field here, getting ready to install an Independent exchange just as soon as the company finishes the $60,000 exchange at Clarksville, which is nearing completion. This representative says the Cumberland telephones now in use here are thirty years out of date, which accounts very largely for the miserable telephone service given subscribers in this city. The Cumberland management has been making investigations here, and from the interrogatories propounded to the subscribers, it would seem that they wish to shift the responsibility for the poor service off on the operators.

PUTNAM, TEX.—Alis Williams is figuring on putting in a telephone switchboard at this place.

MONROE, WIS.—The Monroe Telephone Company is constructing a line from Orangeville to Clarno and expects to have it completed by the middle of January.

MISCELLANEOUS

WATERLOO, IA.—Dr. C. F. Bennett, manager of the Cedar Valley Telephone Company, has just returned from a business trip to Chicago. Regarding the recently published statement that the Cedar Valley Company was about to be transferred to the Iowa Union Telephone Company, the doctor says the story is wholly without foundation. There have been no negotiations looking to this end, and he scouts the idea of selling to their competitor at this time when the Cedar Valley Company was never stronger nor more prosperous and expanding. The company nor any of its officers have had any negotiations with the Iowa Union, and none were even dreamed of. Negotiations of a wholly different nature, however, have been and are pending. At the proper time the public will be made acquainted with these plans. But until that time the public need have no fears that the Cedar Valley people are going out of business. On the other hand, these negotiations look toward an enlargement and extension of the present system far beyond the expectations of the most sanguine.

ST. PAUL, MINN.—The citizens of North St. Paul want better telephone service. At a meeting of its business men, it was decided to ask the Twin City Company to extend its lines to that city. Mayor J. W. Harris and County Commissioner Wright held a conference with the officials of the Twin City Company recently, and guaranteed that if the company would extend its lines to North St. Paul 100 new subscribers would be furnished at once. The Twin City Company already has lines as far as Gladstone, and it is contended it would be little trouble to make the extension the North St. Paul people ask for.

BUFFALO, N. Y.—The Inter-Ocean Telephone and Telegraph Company has filed in the County Clerk's office notice of intention to move its place of business from Steuben County to Buffalo. The directors who signed the papers are Burt G. Hubbell, Charles E. Austin, Arthur D. Bissell, Theodore S. Fassett and Martin Carey, of Buffalo, and Kern F. Gill, of Cleveland.

WARWICK, N. Y.—The Warwick telephone system is now connected with the Sussex Telephone Company, managed by Dr. Miller, and can talk with Newton and places along the line. Also with the Farmers' Telephone Company, with headquarters at Sussex and managed by Mr. Haggerty. In a short time it is likely that the Warwick system will have a connection into Goshen and probably two into Middletown through Independent companies.

BOWLING GREEN, OHIO.—The Weston Home Telephone Company is now closing out the business of the old company and getting in shape to do business. The stockholders met January 5, to hold the first annual election of officers.

BALDMOUNT, PA.—The stockholders of the N. R. and L. W. Telephone Company met recently to consider the advisability of making contracts with the Consolidated Telephone Companies of Pennsylvania for the purpose of connecting with that company for long distance service.

HARRISBURG, PA.—The directors and stockholders of the Cumberland Valley Telephone Company, at a meeting in this city, turned the lease of the Cumberland Valley Telephone Company of Baltimore over to the United Telephone Company. The lease of the Cumberland Valley Telephone Company of Baltimore, was originally made to the Cumberland Valley Telephone Company of Pennsylvania, but it was believed to be the better policy to make the lease to the United Company. Hagerstown and some other Maryland towns will continue tributary to the Cumberland Valley Company of Pennsylvania. As the United is the parent company, the lease of the Baltimore company was made to it as a matter of convenience.

WASHINGTON, PA.—A meeting of the stockholders of the West Penn Telephone Company was held here recently and the question of an increase of the capital stock was discussed at some length. It was rumored that the meeting was held for the purpose of passing upon a proposition from the Federal Company to sell the West Penn lines to that concern. The stockholders, however, would not admit that any such plan was contemplated. One of them stated that the plan they were discussing had for its object a division of the company in such a way as to enable one set of the owners of stock to operate the Washington branch of the business and the others to take under their wing the county exchanges. The company's interests in Washington at this time are not extensive, inasmuch as the exchange here has been closed for some time.

SALT LAKE CITY, UTAH.—Gov. Heber M. Wells and Samuel Fenton, incorporators and part owners of the Home Telephone Company, emphatically deny the rumor that they have reduced their number of solicitors, preparatory to selling out to the Rocky Mountain Bell Telephone Company. Gov. Wells makes this statement: "We are not going to sell out. We are going to operate our system just as quickly as we can get it in operation, and we propose to give the Bell people a hard rub before we get through. If the public will bide its time and not judge too quickly, it will see the time, and not far distant, when we will be operating not only in Salt Lake City, but throughout the State. You can deny point blank for me the story that we contemplate selling out at this or any other time." Mr. Fenton said it was true that they had reduced their soliciting force, but it was because Mr. Jones had gone East to purchase their plant, and as he would join him there soon, they had let some of the men out as there would be no one to look after them as they should be. "You can deny for me in the strongest terms," he said, "that we are going to sell out. We secured a franchise to operate a telephone system and that is what we propose to do. If matters progress as we anticipate they will, we will be doing toll work in about nine months."

RANDOLPH, VT.—It is expected that within a few weeks the Randolph Telephone Exchange will be established for the village and adjacent territory on the co-operative plan at a lower cost, each subscriber paying an equal share towards its installation and maintenance. It is hoped that the exchange office will be used also by the Orange County (People's) Telephone Company, recently chartered by the Legislature. Twenty or thirty subscribers are already pledged to its establishment, and it is believed it can be made so universal and useful that none can afford to be without it. Lemuel Richmond, H. H. McIntyre and Heber T. Holman were appointed by the informal meeting of citizens to solicit subscribers and confer with the People's line in regard to a central office.

PERSONAL

KANSAS CITY, MO.—Henry Judson has been appointed local manager of the Home Telephone Company. Early this month officers will be elected. Work on the outside construction has practically been abandoned for the present, on account of the cold weather.

BELLE CENTRE, OHIO.—At a meeting of the board of directors of the United Telephone Company, held at Bellefontaine, Ohio, J. O. Angell, manager of the exchange at Belle Centre, was awarded the red ribbon given each year to the exchange showing the largest gain. During the year the increase at Belle Centre was from 52 to 103 telephones.

MARYSVILLE, OHIO.—Manager N. E. Liggett, of the Marysville Telephone Company has employed E. S. Anderson, of Dunkirk, Ohio, to fill the position of superintendent of construction during the illness of George P. Zwerner. Mr. Anderson was connected with the United States Telephone Company, and is thoroughly experienced in every detail of construction work. He will have full charge of the extensive improvements being made in the local system.

WEST CHESTER, PA.—District Superintendent Robert M. Dougal, of the United Telephone Company, has resigned his position, and will be succeeded by Thomas B. Hartman, who is now with the same company. Mr. Dougal will become treasurer of the York State Telephone Company, which has its offices in Philadelphia.

DEADWOOD, S. D.—C. D. Cook, of Chicago, has succeeded George Cornwall as manager of the Harrison Telephone Company in the Black Hills. Mr. Cornwall resigned to accept a similar position with a telephone company in the East. He established the Harrison system in the Black Hills. A year ago he and his associates sold to a syndicate of which Howard D. Maize, of Chicago, is the head.

CHATTANOOGA, TENN.—Mrs. Annie McElroy Brett, president and general manager of the Brett Telephone and Telegraph Construction Company, has been on a trip to Chicago and El Paso, Tex., on business connected with the company. Offices will be opened by the company in Chattanooga and the active work of solicitors will be commenced shortly.

TROLLEY CAR TELEPHONES

THE new telephone system for the expedition of running of cars along the Waterloo & Cedar Falls (Ia.) Rapid Transit system has been installed and is now in fine working order. The switchboard is located in the general offices of the company in Waterloo. It has ten drops at present, which number may be increased to twenty-five when the occasion arises making them necessary. The offices of all the officials are equipped with the latest type of long distance telephones, and through the switchboard connection may be made with the Iowa Union system. The prime object in installing the system is to expedite and simplify the running of cars, especially on the interurban system between Waterloo and Cedar Falls and Waterloo and Denver. On the Cedar Falls line telephones have been located as follows: Broadway Junction, Cedar River Park, Sans Souci Park, Midland Park, Rownd's Park, Cass Junction, Cedar Falls, Normal Hill.

Along the Denver line telephones have been established every two miles. In case there is a break down from now on the line need not be blocked so long as it has been in the past when accidents have occurred. At the most, the break down cannot be farther than a mile from a telephone, and it will require only a short time for the employe of the car to walk and telephone the troubles to the general offices. Other cars may then be put on or such steps taken as may be advisable under the circumstances.

The line will be continued to Waverly and Sumner as soon as possible, and is of inestimable service in the prompt running of trains.

COUNTRY TELEPHONES VALUABLE

THE value of a country telephone was proved a few days ago by the following incident, says the Sussex (N. J.) *Independent*. While Dr. G. A. Elston, of Corey, Pa., was visiting G. B. Elston, of this place, Ellis Van Inwegen, of Greenville, N. Y., chanced to pass. Seeing the doctor, and being an old schoolmate, he stopped for a friendly chat, leaving his "lifelong gentle" horse at the front gate, untied, when suddenly the faithful animal decided to make a record-breaking trip home. For a moment Mr. Van Inwegen was beside himself; then he started to sprint, hat in hand, when George halted him, saying, "Wait; don't rush off mad. What is our Mt. Salem telephone for?" Then stepping into the house he telephoned to his next neighbor, P. E. Carpenter, asking if he had seen anything of a runaway horse. Ed looked out of the window and said, "Yes, I see him coming down the hill now." Dropping the telephone, with his usual agility he rushed out and stopped the wild and frightened animal without loss of life or limb; after which Ellis said, "By gum! telephones are what we farmers need. George, how soon are you going to extend your line to my place? Put me down as a new subscriber." Then Ellis started home, rejoicing in the fact that he would not have to walk the whole distance, and the possibility of having a telephone himself in the near future.

PRIVATE SYSTEM FOR DEPARTMENT OF AGRICULTURE

THE Government has recently installed a private telephone exchange system for the Department of Agriculture in Washington. The exchange equipment is located in the main building, connections being made by aerial lines, to about fourteen other buildings in the vicinity. The sub-station instruments are of the latest desk type and are located in the various offices and laboratories that have business with the department.

The switchboard cabinet is of finely finished mahogany in which apparatus for sixty line circuits is located. Connections to the distributing frame are 21 pair switchboard cable, soldered directly to the line jacks. The distributing frame is of the combined type, with provision for mounting the protection apparatus. The latter is of an improved type of carbon block lightning arrester and sneak current protector.

The power plant for supplying all current used in operating the system is complete in every detail, consisting of a duplicate set of "Chloride Accumulator" storage batteries, arranged to be charged by a Holtzer-Cabot combined charging and ringing machine; a power board of marble, mounted on an iron framework, and provided with necessary instruments and switches for operating the power plant.

All apparatus for the system was furnished by the Kellogg Switchboard and Supply Company, which also installed the plant complete ready for service, including outside construction and connecting the sub-station instruments.

TRADE NOTES

G. M. Gest, the conduit contractor, has been awarded the additional contract in Dayton, Ohio, by the Oakwood Street Railway Company and the People's Street Railway Company for the reconstruction of their tracks in that city. This contract amounts to approximately $15,000.

The Chicago Pay Station Company is receiving an encouraging number of communications relative to a 1c. coin machine from the smaller companies where it seems inadvisable to charge 5c for local service. This company has filled a number of orders for machines having 1c coin slots. This rate seems practical in an exchange of 200 subscribers for local service, as it is more profitable to the telephone company than "dead head" service and inexpensive to the non-subscriber who requests service.

The C. A. Manufacturing Company, of Austin, Texas, make a preservative for telephone and telegraph poles, etc., that is probably the most meritorious of the various like preparations sold. So successful has the C. A. wood preserver been that numerous firms in this and other countries have frequently endeavored to duplicate it. The latest is a German company, which endeavored to copyright the trade-mark adopted by the C. A. Manufacturing Company. The application of this firm was promptly refused by the German Imperial Patent Office.

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

INVESTMENT OPPORTUNITY.—Telephone plant, 1 year old, 195 subscribers, 85 miles toll lines in booming town, 4,000; connections with Independent long-distance lines in view. Good reason for selling out. Address A, care of American Telephone Journal, N. Y.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

A COMPETENT MAN to take charge as Manager of a 200-subscriber telephone exchange. Position permanent on merit. Address Box 212, Milford, Indiana.

TELEPHONE SUPPLY SALESMAN with 15 years' experience as superintendent construction, manager operating department, right of way buyer, and salesman and installer of pay stations in U. S. and Canada, will be open for position January 15th. Address G. N. J., care The American Telephone Journal, New York.

POSITION WANTED by strictly temperate man, 25 years old, with seven years' experience in Independent and Bell systems. Experienced in all branches of work. References from former and present employers. South preferred. Address EXPERIENCE, care American Telephone Journal, New York.

I WANT the exclusive handling of an account, for Chicago trade, beginning January 1st. Manufacturers' Agency basis. Address Salesman, care American Telephone Journal, Monadnock Building, Chicago.

FORMER assistant exchange manager in charge of 2,900 subscribers, New York City, is open for position. Age 29, technical graduate, broad business experience. Address R. A. D., care The American Telephone Journal, N. Y.

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UNIFORMITY OF PRACTICE

By Herbert Laws Webb.

A MOST desirable thing in telephony is uniformity of practice, a uniform method of working both as regards station apparatus and exchange apparatus, and also, it might be added, as regards station and exchange talking. It is all very well to say, "Don't travel, telephone!" and without question many troublesome journeys are saved by the use of the telephone. But people still continue to travel; on their honeymoons for instance, and even on occasions for business purposes, and when a man goes from place to place, he ought to be able to use the telephone as easily in one place as in another. That is, he ought to find the telephone worked in precisely the same manner in all places—the same method of operation as regards the handling of the apparatus, and the same routine as regards the answers from the operator. Any departure from a uniform method of working necessarily causes delay and confusion when some stranger comes along, and every large city always shelters many strangers; otherwise what would all the big hotels do?

It is distinctly to the advantage of the telephone companies to cultivate uniformity of practice, for the reason that any measure which renders the use of the telephone by the public, easier and simpler, makes for the improvement and economy of the service. This is obvious when one considers how much the general efficiency of the service is dependent on the proper handling of the subscriber's end of the system. If a man comes along who is accustomed to a method of running the telephone service totally different from your method, he will cause a lot of trouble before he falls into your ways; and our traveller, on his side of the question, is in no way to be blamed if he betrays irritation on finding that the telephone is worked in a diffrent manner in each of several towns that are quite close together by rail.

The common battery system makes for uniformity of practice, as with a common battery system it is practically impossible to indulge in any of the divided methods of working, that were prevalent in the old days in the United States, and still are in countries where the common battery has not yet made great headway. For instance, in the days of the magneto system, some telephone managers used to make the subscriber work his own way through with a trunk connection. The answering operator would connect the calling subscriber to the incoming trunk operator at the distant exchange, and he would then have to repeat the call, always an exasperating experience, but especially so to the telephone user not accustomed to that method of working. This practice of throwing a good part of the work on the subscriber has its defenders on the score that if the subscriber is kept occupied, he appreciates better the work that is done by the exchange, and does not so readily become impatient. This is looking at the matter from the wrong point of view entirely. The telephone company's aim is, or should be, to put the connection through as quickly as possible, with the minimum expenditure of time of the operator and of the plant. This is best accomplished by throwing the work on the expert operator and by giving the inexpert operator—the subscriber—as little to do as possible. Any other idea is fundamentally wrong.

The common battery system carries out to perfection the correct idea of operating, in which the work of making and unmaking the connection is almost wholly done by the trained operator and the plant, and the work of the subscriber is reduced to the simple acts of taking down the receiver and replacing it, of speaking numbers distinctly and accurately, and of believing what he is told. The common battery system does not lend itself at all to what one may call freak methods of operating, nor encourage in any way, misguided efforts to throw part of the work on the subscriber. With a standard routine of giving and checking numbers, every common battery system should be operated exactly in the same manner, and a telephone user who is accustomed to the common battery system, should find telephoning in any place where it is used, precisely the same kind of work as in any other.

Therefore with the common battery system, uniformity of practice resolves itself into a uniform phraseology in the handling of connections, and one other point. This point might perhaps better be mentioned first. It consists in giving directly to the subscriber the signal for "busy" instead of translating it into words. Many practised telephone users already recognize the signal and waste no further time, and there is no reason why all subscribers should not take the signal, which is distinctive enough, as a notification that the connection cannot be completed for the moment, and so save their own time as well as that of the operator and of the plant. As for uniformity of phraseology it should be a simple matter to secure that. The universal answer to a call should be "Number please?" The number should invariably be repeated back by the operator, figure by figure. As to other phrases, "Number so-and-so is busy" may well be conveyed by the signal, as just suggested. "Number so-and-so doesn't answer" is not so easy to replace by a signal; the same signal as for "busy" might be used, but this is hardly practical, as for one thing it would be inaccurate, and for another it would hardly be fair to keep the calling subscriber waiting for some time and then give him a signal only, which he would soon recognize as the same signal he ordinarily received for "busy," a second or two after giving a number. We can scarcely hope to train subscribers to distinguish between several different signals, so "don't answers" must continue to be notified to the calling subscriber by word of mouth.

Here in England, where I am writing at the present moment, there are curious and awful examples of lack of uniformity of telephone practice. There are at least six and probably seven or eight different methods of working, in force, and the tendency seems rather to add varieties than to diminish them. In London, both the Post Office and the National Telephone Company are using the common battery system at the larger and newer exchanges, and several of the National Company's exchanges in other large towns are equipped with the common battery system. The Glasgow municipal exchange is worked on the good old call-wire system, abandoned everywhere else many years ago. Between the call-wire and the common battery, there are several methods of working, requiring different manœuvres on the part of the subscriber. A variant on the ordinary magneto system is what is known as the "ring-through" system. According to this method of working, the calling subscriber, after being connected at the exchange, rings up his correspondent himself. This involves a special clearing-out signal, arranged so that it will be operated, not by the magneto current, but by pressing a special red button on the instrument. A further variety of this system utilizes the red button both for calling the exchange and for clearing-out, the magneto being used only for ringing the distant station. Consequently when an English telephone user finds a telephone with a red button on it, he may be required to press it for the original call and for the "ring off" signal or for the ring off signal only; when he presses it for the original call it may simply operate a signal or it may connect him with a call-wire operator, in which case the manœuvres with the telephone itself will be slightly different; and again, if it is a call-wire red button, when he presses it for disconnection he must not merely press it, but hold it down and give the order for disconnection to the operator. A telephone user accustomed to common battery automatic working, who was suddenly obliged to use a red button instrument on the "ring through" system, would be pardoned for thinking that telephony had taken a step backward, even if he thought nothing more violent than that; but a subscriber who had been educated to one style of red button operating, say that in which the button is used for calling as well as for "ringing-off," and then came to a place where the red button was used for "ringing-off" only, would, when he finally got straightened out from the confusion that his previous training would lead him into, have some strong remarks to make on the eccentricities of telephone managers who gave him exactly the same appliance, to all appearances, to be used in a different way in each place.

The aggregate of delay, confusion, annoyance and inefficiency caused by this wide range of variety in the methods of operating must be very great, and may well be a serious factor in making the telephone service unpopular. The efforts of practical engineers and managers are directed toward standardization in all branches of industry, and it is well that this should be so, as all interested, suppliers and customers alike, are the gainers by standardization and uniformity of practice. Telephone managers must always bear in mind that the efficiency of their systems is largely dependent on the coöperation of the general public, and they will go far toward securing and retaining that coöperation, by making the method of working simple and straightforward and as uniform as possible in all places. For the general public it ought to be as easy and as natural an act to use the telephone, as to step on a street car, to affix a stamp to a letter, or to turn on the gas or electric light.

INCREASING THE REVENUE OF AN EXCHANGE

By N. H. Holland.

THE subject of a recent editorial in The American Telephone Journal was the comparatively short time that each line connected with a telephone exchange is in actual use each day, and the question was raised if there were not means of increasing the line revenue. The average length of conversation as given by the last report of the Bell Telephone Company is a trifle over two minutes, and the average number of connections for each telephone about eight per day. This means that each instrument is in use less than half an hour of the twenty-four. Although on some lines the time of use is much greater, the fact remains that the vast network of wires required in a moderate telephone plant is idle a large proportion of the time. The problem is to increase the earning power of this expensive plant without interferring with the regular service, and it is the object of this article to make a few suggestions as to how this may be done.

One scheme is to wire subscribers' houses with thermostats and charge a certain sum for fire alarm service, utilizing the regular telephone line wires to convey the signal to the central exchange. Such a plan is feasible, and several circuits have appeared showing such a service without interference with the telephone.

The Western Union Telegraph Company adds to its revenue by the sale of standard time. Could not telephone companies also furnish similar service? Small clocks could be furnished to each subscriber, controlled by a master clock at the central office. There are several such systems now on the market; and to operate the clocks over a telephone line is not a difficult proposition. As the current to operate these clocks must traverse the line whether the telephone is in use or not, the impulses of current should rise and fall so gradually as to be inaudible. Such a current can be obtained by several well-known methods. While furnishing time or fire alarm service should increase the revenue now obtained from telephone lines, the best method is to encourage the use of the telephone instrument itself on a measured service basis.

Possibly a lesson can be taken from our friends in the street railway business. A great many of our trolley roads have established parks at the end of the route, where some form of entertainment is given. These parks are often free, but sometimes a nominal fee is charged, the main object being to increase travel on the road. Could not the telephone companies, by establishing a concert room, where instrumental and vocal music would be rendered, and to which subscribers would be connected for a small toll, gain a similar advantage in their business. Loud-speaking receivers could be used and music delivered vastly better than from any form of "talking machine." The tremendous number of these latter instruments that are sold indicate that such a form of entertainment is appreciated by the public.

A form of increasing telephonic revenue has been quite successfully tried in Germany. This consists in furnishing the subscribers with telephone news service. Persons with the ability to read clearly and distinctly are selected to read the daily news through powerful transmitters during certain hours of the day. Any subscriber desiring to receive the news, places the receiver to his ear and can comfortably enjoy the latest sensations without reading them himself.

Something on the line of furnishing music by telephone has been done in London, and it would seem a field that would repay careful consideration.

In the opinion of the writer, there is still a more direct way of increasing the use of the telephone, and that is by an improved manner of handling calls when the line required is found to be busy. *The Arrester*, in his excellent series of articles in The American Telephone Journal, has pointed out the advantages of educating the subscriber to promptly attend to his telephone, and such advice would no doubt greatly help good service. But this does not get rid of the greatest difficulty in the "busy line" question. The great drawback is the fact that the subscriber cannot rely upon his telephone to give him prompt communication in case of necessity. He has absolutely no idea when he may find the line he desires disengaged, and every time he calls up he takes a chance of being unable to get the desired party. Should the line he desires be in use three-quarters of the time, the chances are three to one against him at any given time, but as the bulk of the telephone business is transacted in about two hours, his chances are much less. Of course, he has the privilege of repeatedly calling up until the connection is effected, but that he may call a great many times without success is probable and is a common experience of telephone users. The writer recently made eight ineffectual calls in an endeavor to get through an important message, and finally was obliged to "travel" in order to get the message to his correspondent in time. How, then, should such calls be handled? As the average length of telephone conversation does not exceed three minutes, no subscriber could complain if he had to wait until a conversation was finished when he found the line he asked for busy. If he was treated in his connections over the telephone in the same manner as he is treated in other business transactions, being served in his proper turn, the greatest source of annoyance in the telephone business would be eliminated, and, incidentally, the use of the instrument would be increased. This desirable state might be brought about by an extension of the busy circuit in the following manner:

The operator, upon finding a desired line busy, would, upon advising a subscriber of the fact, ask him if he wished that line as soon as it was disengaged. Then, by attaching a connection to the busy circuit of both the calling and called for lines, which circuit would contain a special signal to be displayed as soon as the test current was removed from both lines, or when they were both disengaged, she would have an automatic memorandum of the desired connection, which would compel her attention as soon as the lines were in condition to be connected; and she would then ring up both parties and complete the connection. This would mean some special arrangements, and in a large exchange the "stored call" should be handled by an operator exclusively retained for that work. As the circuit would be local, however, it could be applied to any of the existing systems. With measured service, a method of handling all calls until a complete connection is obtained becomes of greater importance. That something will have to be done to modify the nuisance of finding the line continually busy when wanted, is universally recognized. A leading article in The American Telephone Journal in the issue of May 31, 1902, emphasized this very strongly, the statement being made there that in exceptional cases the busy signal is given to as much as seventy-five per cent. of all in-coming calls.

SOME STEPS IN THE EVOLUTION OF CIRCUIT DESIGN
ARTICLE VII.—THE TRUNK CIRCUIT ON THE SELF-RESTORING DROP SYSTEM

By J. C. Kelsey

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It may next be assumed that one of the branch grounded exchanges has been rebuilt on the self-restoring drop system, and is the counterpart of the Main Office. This will make the outgoing and incoming trunks similar. To take care of the grounded lines remaining, it is necessary that the cord circuits be equipped with suitable keys to cut the repeating coils out or in.

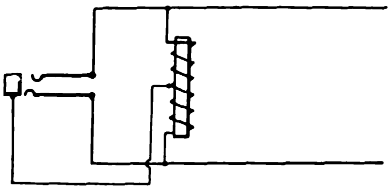


FIG. 37.

In designing a trunk circuit for work between two similar exchanges, one must remember that, as both the "A" and "B" cord circuits are normally equipped with repeating coils the trunk must be built without coils, unless the coil belonging to the "B" cord is incorporated permanently in the trunk circuit. But some means must be provided for a disconnect signal placed at the "B" end, which shall depend upon the entrance of the plug at the originating end. Having a coil at the "B" end, with its middle point available, a magnetic signal may be connected to it without unbalancing the trunk. At the "A" end there is no permanent repeating coil, and some means must be provided which will permit the introduction of a grounded battery upon the trunk, upon the entrance of the plug, without causing unbalance. This can be accomplished by balanced retardations or impedances, bridged across the line, whose middle points are brought out, as shown in Fig. 37.

Fig. 38 shows the application of the retardation to the trunk circuit, in which R is the retardation, RP the repeating coil, K^1 the operators' listening key, K^2 the ringing key, and P^2 the trunk plug. R is the receiver of the talking set. When a call is made for a party in the other exchange the operator presses the order key, and informs the "B" operator that a party in her exchange is desired. "B," having all the trunk plugs before her, readily names a trunk not in use, and proceeds to test the jack of the desired line. If not busy, she rings on the line. In the meantime "A" has inserted her calling plug in the trunk jack, which causes battery to flow over both sides of the trunk line, and energizes the magnetic signal. This assures "B" that "A" has the right trunk, and she knows that when the party answers the "A" exchange is ready. If the called party rings off the "A" operator gets the signal, and the act of pulling out the plug gives "B" simultaneous notice to pull down her connection.

Assume that both exchanges are metallic, that no repeating coil is used, and that an impedance coil is introduced at each end of

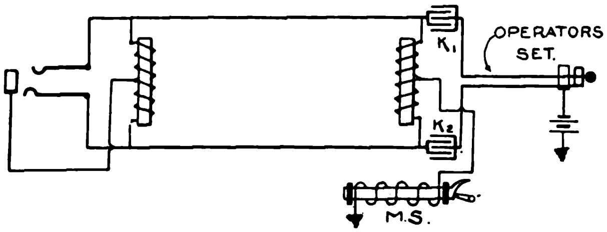


FIG. 40.

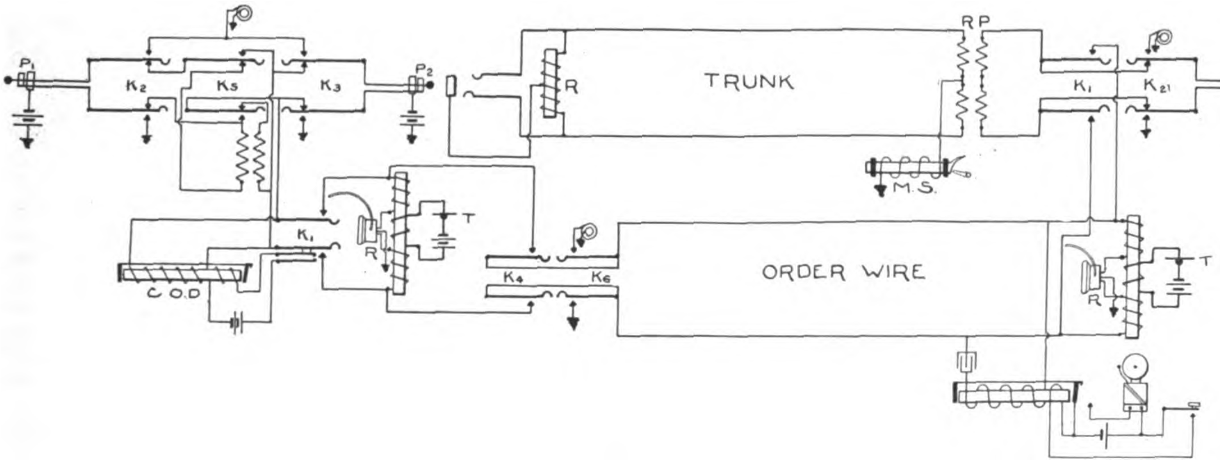


FIG. 38.

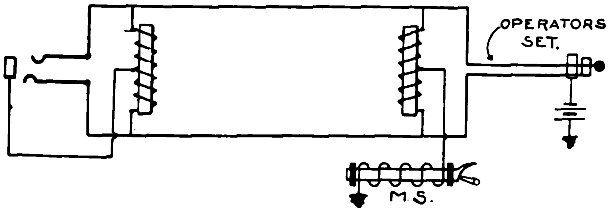


FIG. 39.

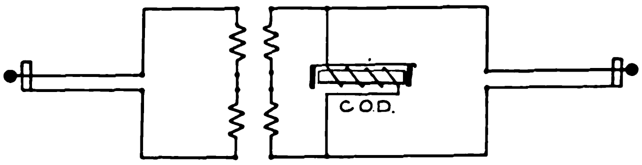


FIG. 41.

Editor's Note.—The first article of this series appeared in the issue of November 29. They will continue for many months.

the trunk circuit for signaling, as in Fig. 39. As in the former case "A" orders a connection and "B" tests to see if the desired line is busy. It tests busy, and so does every line, whether it is or not, for the reason that the act of inserting the plug at the "A" end has raised the potential of the trunk line eight volts. When "A" pulls out her plug, then "B" gets a reliable test. To make this circuit work "B" would have to test quickly before "A" plugged in, or "A" would give a false test.

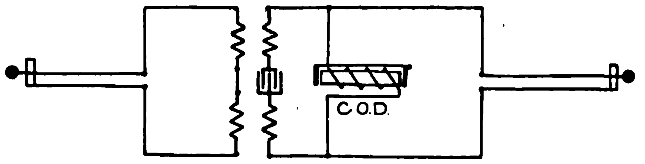


FIG. 42.

To overcome this difficulty place two condensers in the trunk circuit at K¹ and K² in Fig. 40. Condensers play a very important part in modern circuits, serving to restrain battery from flowing out on the line. The retardation coils should not have less than 250 ohms resistance in each half, and the ring off of the called subscriber should easily thrown down the clearing out drop at "A."

In a cord circuit with a repeating coil there may be some difficulty in getting a clearing out from both parties, as half of the repeater, short circuits the drop, shown in Fig. 41. A party on the answering side could ring down COD inductively, and on the calling side could probably ring COD if the coil did not take all the ringing current. To overcome this, place a condenser K¹, as shown in Fig. 42, at the middle points of the repeating coil. Consider the behavior of a condenser. To continuous currents it offers infinite resistance, hence continuous current will not flow through it. To a ringing current an alternating current of low frequency, say twenty cycles per second, which is not far removed from a continuous current, it offers considerable resistance, for example a 2 micro-farad condenser offers about 6,000 ohms. To voice currents having high frequencies the condenser offers an insensible resistance.

Considering Fig. 42 we find two paths for the ringing current. The condenser offers a resistance of 6,000 ohms. The drop offers 500 ohms resistance to continuous currents, but to alternating current, the impedance greatly augments this. To voice currents it may offer a resistance of 50,000 ohms. To ringing currents it may offer, let us say, 6,000 ohms. So in Fig. 42 a ringing current finds equal paths of resistance, and divides itself. Thus the drop receives its share of the current.

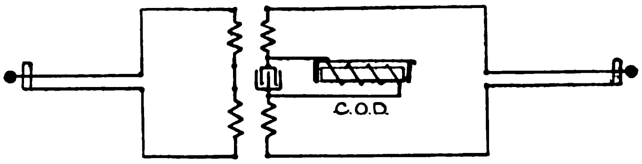


FIG. 43.

Fig. 43 shows the drop directly across the condenser terminals, which is the most advantageous way, as it clears the talking circuit of one bridged impedance.

FOREIGN CURRENTS

By "The Arrester."

London, January 7, 1903.

VERY little has been heard of the practical application in the United States of the Pupin method of treating telephone conductors for increase of range of transmission. The principle of Prof. Pupin's invention, it will be remembered, lies in the balancing of the capacity of a circuit, by the insertion of inductance coils in the line at stated intervals, resulting in the production of a "distortionless" circuit, along which the telephonic waves travel without losing their original shape and character. The compensation of capacity by inductance was suggested by Oliver Heaviside and by Professor Sylvanus Thompson, but to Professor Pupin is due the credit for determining exactly how to apply the added inductance, so as to produce the desired effect. If the inductance coils are put in the line at improper intervals, the transmitting powers of the line may be not only not improved, but positively diminished. In a recent number of the *Electrotechnische Zeitschrift* an account is given of some experiments conducted in Germany by the Siemens and Halske Company and the Imperial German Post Office in the application of the Pupin system to actual working lines, both underground and overhead. The experiments give a convincing proof of the great technical value of Pupin's invention.

* * *

The cable experiments were carried out on a line between Berlin and Potsdam, the cable used being one about 20 miles long, laid by the Siemens-Halske Company a few years ago for the German Post Office. It is an ordinary dry core paper cable with 28 pairs of conductors, the conductors being about No. 18 gauge. Of the 28 pairs, fourteen were left in their original condition, a most convenient arrangement, as it was thus possible by direct comparison between the equipped and unequipped lines to obtain a clear idea of the improvement gained. The inductance coils were put in at the existing junction boxes and were spaced about three-quarters of a mile apart. Each coil introduced a resistance of about 4.1 ohms in each wire of the circuit and an inductance of about 0.062 henry. The resistance of the cable conductor with coils included amounted to about 37.6 ohms per mile. The insertion of the coils increased the inductance of the circuit about 200-fold and reduced the "attenuation constant"—that is, the measure of the effect of the capacity in distorting the waves—to about one-sixth.

* * *

As a result of this large reduction in the attenuation, a considerable improvement in audition was to be expected, and did, in fact, result. Comparing an equipped circuit with one of the simple circuits between Berlin and Potsdam, an enormous difference was noticed in the loudness of the tones. While with an unequipped line the distance from the receiver for good audition could not exceed twenty inches, with the equipped line audition was perfectly distinct at the opposite end of the room, over thirty feet distant from the receiver. This experiment was made with the ordinary type of Siemens subscriber's instrument, two cells of battery being used for the transmitter. By joining the various conductors in the cable in series, experiments were made with longer circuits. Joining three lengths in series gave a circuit of over 60 miles, and comparing the loaded and the simple circuits, gave results even more striking than in the first case, when the speaking was carried on over a length of only 20 miles. While it was possible, with the loaded line, to hear clearly at a good distance from the receiver, with the unloaded line the limit of hearing had been reached, confirming with exactitude, the results theoretically arrived at. With a circuit of 100 miles, it was only a very accustomed ear that could detect the slightest movement in the diaphragm of the receiver on the unloaded line, while with the loaded line a very distinct articulation was produced. By direct comparison the talking over the loaded circuit of 100 miles was found to be about the same as that over the unloaded line of only 20 miles. With a loaded line of 260 miles, reception was still possible, but the tones were very weak.

* * *

Comparing an overhead circuit between Berlin and Potsdam of .08 in. (No. 12) bronze wire with a loaded circuit in the underground cable of same length, the loudness of speech was about the same. The results depended a little on the state of the weather. In good weather the loudness on the overhead wire was a very little greater than on the cable, while in bad weather the reverse was observed, the cable circuit being a little louder than the overhead line. The result of this comparison is most noteworthy, as it shows that by the application of Pupin's system, a cable with a conductor of .04 inch in diameter can be rendered equivalent in transmitting capacity, to an ordinary overhead wire of .08 inch diameter, or four times the section. This result presents a striking confirmation of the correctness of Pupin's views, as it fully bears out the theoretical calculations. After the satisfactory conclusion of the cable experiment, further trials were made on overhead lines. A line between Berlin and Magdeburg, distance about 95 miles, consisting of .08 inch bronze, was equipped with coils, a coil of 6 ohms resistance and .08 henry inductance being inserted at every 2½ miles. This line gave considerably louder talking than a heavier wire (.12 inch) between the same points. Previously, of course, the talking over the .08 inch wire was much poorer than that over the .12 inch.

* * *

To confirm the speaking tests, quantitative measurements were made of the received currents on the loaded and unloaded lines, by means of an alternating current galvanometer, having the same resistance and inductance as an ordinary subscriber's set. Alternating currents of 900 and 400 periods and of 3 milliamperes strength were sent into the line for these measurements. At 900 periods the received current on the Pupin cables circuit was 1.2 milliamperes and on the ordinary circuit, 0.17 milliamperes, so the former was seven times the latter. At 400 periods the difference between the loaded and unloaded circuit was still considerable, although the damping in the ordinary circuit is much less at the lower periodicity. The overhead wires showed similar results. The strength of the received current on the 95-mile length of .08 inch wire without coils, was 0.53 milliamperes, and on the same line loaded 2.2 milliamperes. On the .12 inch wire the received current was 0.84 milliamperes. The loading of the .08 inch wire with inductance coils therefore raised the received current over fourfold, and to a value nearly three times that of the .12 inch wire. On still longer lines, just as in the case of cables, the improvement made by the insertion of the inductance coils would be still more marked. Measurements made at different states of insulation showed that the Pupin circuit was more affected by bad insulation than the ordinary circuit, but even at a very low insulation the Pupin circuit was considerably superior to the .12 inch unloaded line.

* * *

The article from which these very interesting data are drawn says that the conclusion arrived at is that for telephone conductors on Pupin's system, one-quarter the weight of copper hitherto used will give the same efficiency, or, in other words, at least four times the distance can be covered by the same weight in copper. The article concludes as follows: "The experiments here given prove that by the insertion of inductance coils in telephone circuits in the manner described by Pupin, the great advantages theoretically claimed are obtained in actual practice, and that a new field is opened for a wider extension of telephonic intercommunication, for even the problem of trans-Atlantic telephony might be considered within the bounds of possibility; but unfortunately the cost would be excessive, and the technical difficulty of the construction and submersion of a cable with added inductance coils in such great depths must be considered as lying outside the realms of practicability, though for shallower waters, as the North Sea and Baltic, the laying of such a cable may be deemed to be not utterly impossible, thus securing direct communication between London-Berlin and Berlin-Copenhagen."

DAILY TROUBLE SHEETS

By William H. Hyde.

To keep track of all the instrument and line troubles occurring at different exchanges, managers should be provided with a standard blank form. If this is done a complete record of each exchange may be kept on file.

The name of the exchange and the month should be entered at the top of the sheet, then the day of the week and the date. Underneath, note the troubles for the day. If no troubles occur on any day, note underneath, "No trouble reported to-day." (For a blank form to be used see Fig. A, length of blank optional.) In all cases use a complete sheet for each day's record.

These sheets should be kept by the chief operator, or wire chief, who should be instructed to note all troubles *as soon as they are discovered,* giving full description of each in the proper columns, showing line number, name of subscriber, description of trouble, time reported or discovered, time repaired, and by whom. If any delay note the cause in the remark column. Two lines crossed together may be noted on *one line* as follows:

"721 Jno, Smith X with 826 Jno. Jones, etc."

Troubles that are to be carried over from one day to the next should be noted as follows: Under "time repaired" write the word *carried,* enter the trouble on the following day, and under "time reported" write *carried.* If this is done, it can be seen at a glance what troubles have been carried over from the day before. At the end of the month, the general superintendent can have all the exchanges tabulated, for the purpose of noting the delay in repairing troubles, the troubles per subscriber at each exchange, the percentage of trouble per subscriber, and note the exchanges above the average.

Exchanges whose records are above the normal, may then be taken up separately. If it is found that the line troubles predominate, a repair crew may reduce the troubles very materially. If, on the other hand, the instrument troubles predominate, the manager may not be giving the instruments in his exchange the proper attention, and a visit by the "Traveling Inspector" is in order, to ascertain the facts.

Editor's Note.—The blank should have a column for material and time used and expenses.

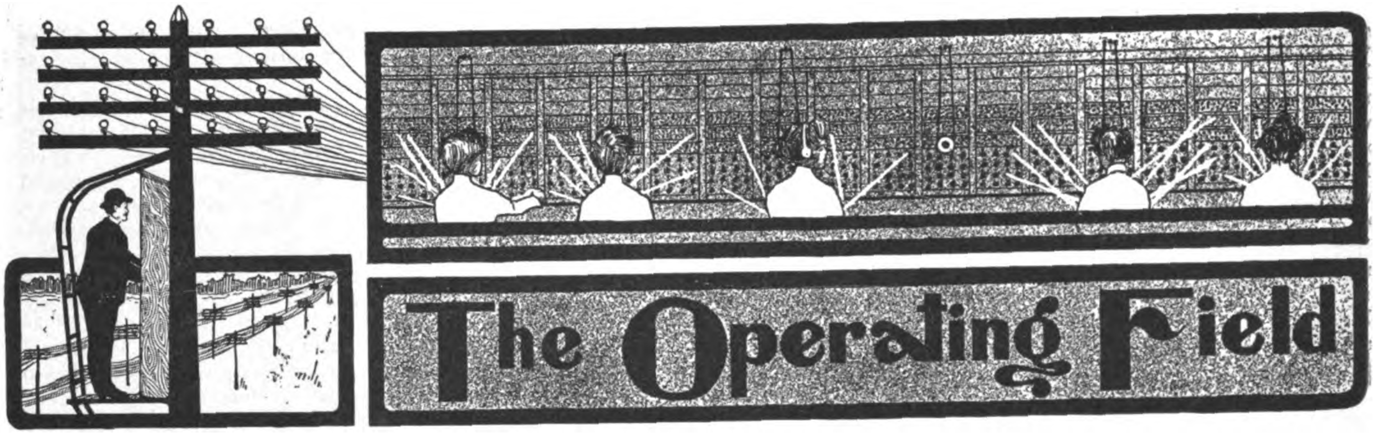
________________TELEPHONE COMPANY.

DAILY RECORD OF TROUBLES.

________________ **Exchange** ________________ **190—**

Drop No.	Subscriber.	Description of Trouble.	Time.		Repaired by	Remarks.
			Reported	Repaired		

FIG. A.



ACTIVITY IN NEW JERSEY AND PENNSYLVANIA

By February 1 the Interstate Telephone Company, of Trenton, N. J., expects to have 1,500 telephones in operation in Trenton and to supply its patrons with a long distance service reaching throughout South Jersey and all points in Pennsylvania. The Trenton exchange is now operating 1,000 telephones, and according to a statement made by F. A. Demarest recently applications are being received at the rate of twenty a day. Notwithstanding the fight which is being waged by the Bell people against the Independent telephone movement nearly every business house in the city is supporting both telephones and many have discontinued the Bell in favor of the Independent.

All Independent companies in New Jersey and Pennsylvania have entered into traffic arrangements in order to give them a foothold in the territory now controlled by the Bell. The Interstate Telephone Company, although only in operation since September, is now giving a long distance service as far south at Mt. Holly, including the towns of Bordenstown, Burlington, Columbus and other points in Burlington county. Within a few weeks the company expects to have its lines extended as far south as Camden. In Pennsylvania, the service has been extended to Bristol, and a force of men is now building a trunk line into Philadelphia, where connections will be made with the Interstate Telephone Company. Trenton is now in communication with Philadelphia, but the line has not yet been thrown open to the public.

The Interstate Telephone Company is now preparing a traffic arrangement with the consolidated companies of Pennsylvania and the United Telephone and Telegraph Company. Within a few weeks, or as soon as the line to Philadelphia is opened, connections will be had with the Maryland Telephone and Telegraph Company, which will insure communication with all points in Maryland and as far west in Pennsylvania as Pittsburg. As soon as the long distance service is completed south of Trenton, North Jersey will be developed, insuring connection with New Brunswick, Rahway, Elizabeth, Newark, Paterson, Passic, Hoboken and Jersey City.

NEW MISSOURI COMPANY IN OPERATION

The Home Telephone Company, of Springfield, Mo., has commenced the operation of its plant and already has about 800 subscribers connected. That public sentiment is with the Home Company in Springfield is clearly and forcibly shown by the following which appeared in the *Springfield Leader*:

People of this city have watched with considerable interest the progress of the work of building the plant of the Home Telephone Company. Not only on account of its being a local concern, backed by citizens of this city, but because the completion of this system promised relief in the way of a better service. Probably no one a resident of Springfield or Greene county is in any way interested in the success or otherwise of the Missouri and Kansas Telephone Company, commonly called the Bell, other than as salaried employes. That this company has been arbitrary in its dealings with the public and has never shown a willingness to give the people here such a service as a city of this size should have is beyond question. And when it became known that a company of our citizens, in connection with some outside capitalists, had formed a company to build and equip a first class modern telephone exchange here, and were willing to accept a franchise limiting its rates for a period of 20 years and furnish only long distance telephones and full metallic lines with a guarantee of 600 bona fide subscribers, the best business men of this city welcomed the proposition and contracts for service were readily made with the new company.

Over 600 contracts were secured in early September, and in October the active work of construction commenced. From that time to the present it has been a hard struggle on the part of the company to get in operation by January 1.

Few people realize the magnitude and cost of a plant of this kind. The plant contains over 1,500 white cedar poles. This means about 40 miles of pole line. Over 100,000 feet of cable, nearly 20 miles, and 98 cable terminals have been used. The underground work contains 11,000 feet of conduit. Among other things that has gone into the construction of this plant are 3,300 standard 10-pin cross arms, 33,000 black locust pine, 150,000 feet of steel strand.

The entire plant is planned and built for 3,000 lines capacity, and cable is strung for half this number, meaning that the company can take care of 1,500 subscribers without making any addition to its construction other than merely installing the telephone and running a drop to the nearest cable box, which in no case is much over two blocks away.

The builders claim it is the best built plant in Missouri, and as good as can be found in the United States.

The cost of the plant when completed will be about $150,000. This is in excess of the estimate made by the company at the outset. Part of this amount will be raised by first mortgage bonds and the balance comes from the stockholders.

HOME VS. SUNSET IN LOS ANGELES

In Los Angeles, Cal., the magnificent plant of the new Home Telephone Company is being rushed to completion.

The injunction proceedings brought by the Sunset against the Home to stop work on the latter's plant did not in any way retard the work, which is now well under way.

The following, taken from a Los Angeles newspaper, shows the telephone sentiment in the city:

"Certain society women living in the Southwest, propose to solve the telephone problem in a way that may be as effective as novel. Being imbued with the idea that the trouble with 'Central' has exceeded all limits of endurance, these women have resolved to order out their telephones and get along without them until the new Home company shall be ready to supply the service. A movement headed by the women who have pronounced the doom of the provoking Bell machines is bound to be far-reaching. If Upper Tendom puts the Sunset telephones out of commission, the fashion will be set. Then will the Sunset company's scrap-heap grow.

"One woman who is promenently identified with the movement of retaliation says: 'True, the telephone service, bad as it is, is valued because, occasionally, the line is neither busy nor out of order when one wants to use it. But these times are rare, and it has become a question whether the service, after all, is worth the wear and tear on the patrons' tempers, in addition to the monthly rental of the telephone.'

"One drawback to the proposed movement is the disposition of business and professional men to consider the telephone indispensable. My husband says he cannot do without it, no matter how bad the service,' is the disconsolate assertion of several who would join the movement and would spurn the telephone with its propensity for wrecking tempers."

The division manager of the Sunset company in another newspaper gives some explanations as to why his company does not furnish the first-class service its patrons pay for. His figures may be very interesting data for study, but from all reports the feelings of Los Angeles telephone sufferers have not been soothed by them in the least.

"We have in Los Angeles City 14,802 subscribers—a little over twelve telephones per 100 inhabitants, assuming Los Angeles to have now a population of 120.000, or one telephone to each eight individuals (including babies and children)," says the division manager. "We could not foresee this immense installation, as

"Boston has only 3.2 to 100.
"New York has only 2.4 to the 100.
"Chicago has only 2.3 to the 100.
"Philadelphia has only 1.8 to the 100.
"Cleveland has only 3.4 to the 100.
"Detroit has only 4.2 to the 100.
and so on all through the United States. Our system of graded rates is what has made the difference in this respect.

"Local switching in Los Angeles surpasses per telephone that of any place in the world. For instance our average is 159,000 a day for 15,000 telephones as against 198,000 for 38,000 telephones in San Francisco.

"Furthermore Los Angeles averages about 37,000 busy switches a day as against 29,000 in San Francisco. This means that 37,000 calls are made in one day for people who are being talked to over the telephone by other parties. Of course the busy switches we cannot ameliorate unless people will take more telephones, but our service will improve day by day as we cut subscribers' lines over to the new switchboard, and I expect in the course of a month or six weeks it will be as nearly perfect as possible.

"It requires a year and a half to build and place a new system of switchboards. We commenced in the summer of 1901 to erect new buildings in Los Angeles. Since the buildings have been completed we have been working day and night installing new express multiple switchboards and are now cutting over the subscribers' lines to the new system. With the enormous multiplicity of lines and the peculiar scarcity of operators in Los Angeles we have been prevented for the time being, from furnishing that prompt service which we can and will supply within a few weeks.

"We have imported twenty-five operators from San Francisco, and thirty from cities tributary to Los Angeles, and will import more if the requirements so demand."

No doubt exists that the Sunset Company is anxious, at this late day, to give prompt and efficient service. So long as it had no competition in Los Angeles, there was no incentive to improve its system. Now, however, that the system of the Home Telephone Company is rapidly nearing completion, the Sunset has suddenly become imbued with a desire to do better.

For the Sunset to give first class service in Los Angeles, will require, according to competent engineers, who have looked into the situation, the expenditure of considerable money, and a complete reorganization of its methods and system.

Even should the Sunset better its service, it is extremely doubtful that it could regain the confidence of the Los Angeles public.

NEW YORK STATE INDEPENDENTS

OTSEGO county, in New York State, and the territory contiguous to the town of Oneonta, is being well equipped with telephones, the number of the rural lines having been largely increased the past year and the patronage of the older companies growing rapidly. The next few years will undoubtedly see a line constructed along all the principal thoroughfares. In Oneonta the use of telephones has greatly increased since the advent of the Independent exchange and new subscribers are being added each week.

The Cooperstown Independent company has its line fully completed in Cooperstown and now has a list of over 150 subscribers with eleven telephones at Hartwick Seminary. The new line has connection south with Hyde Park, Hartwick Seminary, Milford, Portlandville, Colliersville and Oneonta. At Oneonta connection is made with all points in Delaware county, as well as east to Cobleskill and west to Bainbridge on the line of the D. & H. Railroad.

Connection is also made at Oneonta with all the villages in the Butternut Valley, and with New Berlin. The line north from Cooperstown connects with Fly Creek, Oaksville, Schuyler Lake, Richfield Springs and Herkimer. At Herkimer connection is made with all cities and towns in the Mohawk Valley.

An extension of the New Lisbon Farm Telephone Company's lines from Mt. Vision by the way of Bowe Hill and Edeson Corners to Milford is being agitated. If sufficient interest is shown by those who reside along the proposed route, the line will undoubtedly be built next summer.

The company now has about thirty-five miles of lines in fine working order, with over 100 telephones in use, from Mt. Vision to Lena, Welcome, Garrattsville and Edmeston.

The stock is in shares of $10 each, and no one is permitted to subscribe for more than ten shares, nor to be a stockholder unless he rents a telephone.

MIXED TELEPHONAGE

WHAT a bother the telephone numbers are! At least there is one girl who thinks the system might be improved. A man tells me that the other day a girl who came in to see his people asked if she might use the telephone, and called up what she thought was the number in Cambridge that she wished to ask if the skating at the skating club was good. The reply was, "We have no skating here too-day." "Well," said she, giving her own telephone number, "call me up when it is good." The answer came back: "This is the Cambridge Cemetery. We have no skating here."—*Boston Herald.*

HELLO CENTRAL BALL AT TOLEDO

A UNIQUE ball was recently given by the operators of the Toledo Home Telephone Company. The ball was in the nature of a benefit for a sick operator. About 300 couples attended, and $200 was realized.

The hall in which the ball was held was decorated with switchboard miniature electric lamps, and there was also a 600 line board in operation. The program, which follows, was very clever:

Hello Central

1—Waltz—Operators
2—Two-step—Managers
3—Harvard—Chief Operators
4—Waltz—Linemans
5—Two-step—Information Operators
6—Waltz—Wire Chiefs
7—Two-step—Cablemens
8—Florodoro Schottische—The Home
9—Waltz—Office Force
10—Quadrille—Supt. of Construction
11—Waltz—Trouble Clerks
12—Peerless—Long Distance
13—Two-step Circle—Switchboardmen
14—Waltz—Supt. of Equipment
15—Two-step—Inspectors
16—Waltz—Three Second
17—Two-step—Number Please
18—Waltz—Sterling

OPINION AND COMMENT

AMERICAN TELEPHONES ABROAD

TO those readers of the AMERICAN TELEPHONE JOURNAL who have carefully followed the very interesting matter that is written for our columns, from week to week, by "*The Arrester*" it must be clear that an immense new field is opening up for the American telephone man. Europe, with the possible exception of Norway and Sweden, has always been twenty years behind this country in the application of telephony. Now, there is a great awakening there. In England every town of consequence is actively studying the problem, and the next five years, judging by present appearances, will see development on a scale approximating very closely that of the United States itself.

Germany, France, Spain and Italy are only slightly less active, and Russia is preparing for the installation of modern systems in all of its principle centers of population. In India, in South Africa, in Japan, even in China, the telephone is receiving more consideration than almost any other industrial feature. The people everywhere are awakening to the fact that no other factor is so closely connected with modern business progress. In the nature of things, America must be looked to by the foreigners to supply the telephone demands. It requires only that American telephone men present their wares and qualifications in a proper form to give them control of the field. For some reason, the foreigner, clever as he is in many other lines of electrical development, seems to lag woefully behind in telephony. Even in Sweden, where the art had its greatest development, thanks to unrestricted opportunities and freedom from monopolistic control, the systems are not up-to-date, according to the American standard. The workmanship in European telephones and switchboards is clumsy. Where the telephones and switchboards have any sort of efficiency they are enormously and unnecessarily expensive. The service is abominable. The condition that exists, even in the greatest cities, such as London, Berlin and Paris, would not be tolerated for a moment in towns of any size on this side of the water. The common battery system is unknown except in a small section of London, where it was introduced under American direction by the British Post Office department The managers, even in the most important centers, are so far below our managers here that, with few exceptions, they could not hold their positions in the most ordinary village Central. The operators are impossible. Such a thing as an operator especially trained and drilled for the service, carefully selected for her special fitness, is unknown. Any girl who has the power of speech and hearing is considered thoroughly qualified. The result may be imagined. It is infinitely less trouble in London to send a message by carrier than a message by telephone, and generally takes much less time. A member of the staff of the AMERICAN TELEPHONE JOURNAL made four separate tests in England recently, and in no case was he able to get his connection in less than twelve minutes. And this, though the numbers called were less than a mile away. With these conditions prevailing, it must be clearly apparent that, with the people hungry for real, first-class service, there is in sight, not alone for the American manufacturer but for the American engineer and traffic man, a field in which rich rewards are certain. The American telephone will follow in the wake of the American electric light and the American trolley car in all of the important centers of the world.

A FINE CONVENTION RECORD

A CIRCULAR letter sent out by J. E. Keelyn as chairman of the Telephone Manufacturers Supply Dealers and Allied Interests Association is a fine reflex of the prosperity that exists in the telephone trade. It devolved on this association to provide for the entertainment and headquarters for the recent Inter-State Convention at Chicago. It is a usual thing for organizations of this kind to face a deficit when the affair for which they are organized is over. Subscriptions lag and money is to be procured only by hard and persistent drumming. The active members in these organizations generally hesitate about accepting office because they know that it often involves a deep dive into the pocket to make good outstanding bills. Instead of facing such a condition, Mr. Keelyn announces that, not alone was the amount subscribed ample to meet all requirements, but enough remains in the treasury of the association to warrant a refund of forty per cent. to the contributors. This record we believe to be unique. It shows an interesting side light on the financial plight in which the unfortunate National association finds itself.

INDEPENDENT LONG DISTANCE LINES

ONE of the most encouraging signs in the Independent field is the manner in which long distance building is being pushed everywhere. Despite the season, construction work is going on wherever outdoor conditions permit. Reports of the work in progress seem to give conclusive promise that the long distance question, which has so long vexed the Independent telephone men, will soon be happily solved. The time is in sight almost when the Independent canvasser can offer as good long distance service as the Bell, thus knocking another pin from under the monopoly.

BUSINESS BUILDERS

THERE is nothing so dangerous to the Independent telephone operator, as the tradition of inactivity handed down to him from a long period during which the Bell people controlled the field. Having a monopoly, the Bell companies never felt called upon to do any of those things, which the ordinary concern finds necessary to obtain and hold business. They learned very early in the game that the telephone was a necessity, and relied upon this to force custom. As a result the telephone business grew up a stranger to all those devices which are common enough in other pursuits. As the pioneers in the Independent field were largely recruited from Bell ranks, they brought along with them a wholesome respect for their form of "conservatism," a word that in its day was greatly reverenced, but which, in these hustling times, stands for old fogeyism. The dry rot which is afflicting so many Bell companies, is traceable, in no small degree, to this self-same conservatism. Fortunately for the Independents, the promising nature of the business attracted a great army of enterprising, ambitious, wide-awake men, from the outside world, men who had been schooled in pursuits where competition brought out the best that was in them. These men declined to believe that a telephone company was doing all that should naturally be required of it, when it set up telephones and switchboards and connected them with wires.

They straightway introduced "business builders," devices that should stimulate the use of the telephone, and hold fast the subscriber once he was obtained. Besides an improved service at reasonable rates, they looked about for ideas that should advertise their business and make friends. As a result, there have been introduced into the telephone field many features that have brought the companies in closer touch with the people, features that would never have been known had the Bell been permitted to rule to the exclusion of all comers.

THE AMERICAN TELEPHONE JOURNAL is interested particularly in presenting as many of these features as possible to its readers. From time to time, we have printed accounts of the devices introduced here and there by progressive managers, and as a result these devices have been very generally accepted, many of them being now in use in every progressive Independent telephone company in the land. This is for the betterment of the general situation everywhere, and operators and managers will help their own service by forwarding to this office accounts of the methods they pursue for building up and improving their business.

CONTEMPORARY CROSS TALK

By "The Listening Key."

THESE notes have dealt chiefly with fundamental principles, and the guiding endeavor has been to point out in them some of the main channels in which a successful telephone business may be run. If a thorough telephone man were asked to name the two most important features of the telephone business, he would probably answer *Rates* and *Service.* There are many and various reasons why these two items out of all that go to make up the telephone business should receive the most earnest study of the telephone manager. As regards the first, it is clearly *the* most important, as the whole business stands or falls by the rates. To put it broadly, if the rates are too high the development of the system is checked, and if the rates are too low, development is stimulated at the expense of profits. To a very large extent, telephone rates have been discussed from a narrow-minded point of view, and by no means sufficient attention has been given to the change that the telephone business has undergone during the past few years. In pointing out these changes and in forecasting the future trend of the telephone service, under a policy of active development, it is to be hoped that our discussions of rates and service may have given the thoughts of telephone men on the important subject of rates a new turn.

* * *

If we were to sum up just here what should be the three main guiding principles to be kept in sight in framing a scheme of rates for a large system, we should put them about as follows: First, that the cost of the average local message is dependent on the distance that it has to be carried, and on the time that it occupies the plant. Second, that different subscribers use widely varying numbers of local messages in a given period of time. Third, that in view of the different amount of use made of the service by different subscribers, different classes of service, or rather, of equipment, may be supplied to meet different wants. Expanding these statements of principle into technical language, one would say that in a large system the local message, and not the yearly use of a line and station, should be the unit on which rates should be calculated; that a scale of rates for providing for various numbers of messages per month or per year, should be adopted, so that subscribers should pay for the service in proportion to the use made of it, small users paying low rates and large users higher rates; and that in order to meet the wants, both of the very small user who wants *some* service and wants it very cheap, and of the very large user who wants a great deal of service and wants it very good, a scale of different grades of service should be provided, running up from party-lines with four, six, eight or ten stations, to private branch exchanges capable of indefinite expansion, and of handling an unlimited amount of traffic.

* * *

The narrow-minded point of view to which we referred just now, takes note of none of these points, nor of the great change that has come over both telephone business methods and the attitude of the public towards the telephone service. It still clings to the old-fashioned idea of one class of service for all and of one rate for all, no matter what the amount of service demanded by the individual subscriber. The public, however, has ideas that do not accord with these methods. The part of the public that has always used the telephone service, is getting to use it more and more, and a large part of the public that hitherto has never used the telephone service at all, now wants to use it some and will use it much more in the future, when the telephone habit is properly acquired. To cope properly with the growing use and growing demand for increased facilities of the practised users, is not practicable with a one-rate system. Graduated rates and a range of facilities are necessary if a profitable business is to be maintained; and in order to tempt new users on to the system, low rates must be provided that will give them a chance to acquire the telephone habit, and to become profitable customers.

* * *

When we come to consider the service it is difficult to say that it is any less important a subject than the rates. The really broad point of view to take of the service, is that it is, so to speak, the commodity which the telephone company sells to its customers. Consequently nothing must be neglected to make the service as good as it possibly can be made. If all telephone managers had always lived up to that principle, the history of telephony would have been very different from what it is. It is a curious fact, however, that the actual details of the service have been very generally overlooked by most telephone managers. Yet by the service absolutely and wholly, is the telephone company and its management judged by the telephone company's many customers. If the service is bad, the telephone company and its management are damned most heartily and unanimously. If it is good, the telephone company is popular and very little fault is found on the score of rates, rights of way or any of the other grievances that are always raked up when a telephone company is to be abused. Unfortunately, a telephone service is rarely really good, which accounts for the extreme scarcity of popular telephone companies.

* * *

When, some time back, we arrived at the minute-mile as being the true unit on which to base telephone rates, and proceeded to make practical application of it in examining the economical efficiency of a local telephone plant, it was clearly shown that the operating efficiency of the service must exercise a great influence on the economical efficiency of the plant. Granted that the minute-mile is the true unit of cost, you cannot base your rates for local service rigorously on the minute-mile, for the reason that both custom and convenience compel you to take the message as the unit of price. This prevents telephone rate-making from being an exact science, as the minute-miles in the local message, will be a variable quantity. One message may contain one minute-mile, and the next from the same subscriber, thirty. Therefore, we have to fall back upon the unscientific but still fairly trustworthy average. We can determine with approximate accuracy the average distance that a local message will have to be carried and the average time that a local message occupies, and so arrive at the number of minute-miles in the average message.

* * *

Leaving aside all the compensating influences that we have discussed, it is clear that since the cost of the message partly depends on the time it occupies the plant, the quickness of the service must have an important bearing on the economical efficiency of the plant. If messages are made quickly, they are made cheaper and opportunity is given to the plant to make more of them in a given time, and so to become more productive. Therefore a quick service is of direct money value to the telephone company, apart entirely from its enormous indirect value in pleasing and satisfying the company's customers. We have seen in our extended analysis of local telephone traffic, that the efficiency of the service in the broadest sense of the term is not solely dependent on the work done at the exchanges, but is influenced, to a large extent, by the work done by the subscribers themselves. The average telephone subscriber, however, makes no allowance for this important fact, and, taking him collectively he will never recognize it, unless it is brought forcibly and systematically to his attention. But efficiency, like charity, should begin at home. No telephone subscriber will be willing to pay much attention to suggestions or directions as to the operation of his station, if he does not get good service from the exchange. If your operators habitually give slow answers to calls, your subscribers will meet any suggestion that *they* should answer calls quickly, with a derision that may seem rude, but is quite justified from their point of view. If your operators are slow, lax, inaccurate and impertinent, the subscriber is provided with a crushing retort whenever you approach him on the subject of his own working of the service. Therefore every reason urges the utmost attention to the efficiency of exchange operating. A thoroughly efficient service at the exchange makes for economy of working, makes for the popularity of the company and for the extension of its business, and is the strongest kind of lever to use with the subscribers in inducing them to co-operate in the production of a service that shall be smart and efficient at all points.

ELECTRICAL MEASUREMENTS—ARTICLE I.

By Arthur Vaughan Abbott.

CIVILIZATION might be defined as the art of working for others. In savagery, each man performs for himself all of the limited category of avocations that his simple life demands. Presently, the stronger and more industrious, accumulate some excess of the products of the chase over their own immediate demands, which are desired by those less successful, who offer their labor, (their only possession) in exchange, and thus primitive commerce arises. But with the very first commercial transaction, originates the question as to *how much* of his commodity, the vendor shall deliver to the purchaser in return for a certain amount of what the latter has to offer; and thus the art of *measurement* is coincident with commerce, even in its most primitive form.

To measure anything, is to ascertain what numerical relation the quantity under consideration bears to some other quantity of the same thing, previously accepted as a standard, or *unit of measure*. Thus the statement that a can contains ten quarts of milk, means that there is ten times as much milk, as is contained in another can of a certain definite size, previously by mutual agreement, accepted as a standard. To say that a piece of board is twelve feet long, means that it is twelve times as long as a certain conventional distance called a foot. To speak of an arc lamp as 2,000 candle power, is merely to state that the arc is 2,000 times as bright as one candle, which is accepted as the unit of light measurement. Similar examples could be indefinitely multiplied to show that every kind of measurement, no matter how apparently complicated and involved, is fundamentally the process of dividing an unknown quantity (the thing to be measured) by a certain amount of the same thing previously accepted as a standard or unit.

In all cases, the unit of measure is, on a searching analysis, purely an arbitrary quantity which has been assumed because, on the whole at some time or other, it appeared *convenient* to do so, and for *no other reason*.

The earliest notion of distance was the amount a man could walk in a day, and this was naturally subdivided into the pace, or length of one stride. The mile of to-day originated in two thousand paces, as marched by the legions of Cæser. For many purposes the pace was inconveniently long, and primitive man passed easily from the stride to the length of a foot print, as impressed on an early sand beach. With increasing civilization, finer and finer sub-divisions arose, greater and greater accuracy was attained, until with some of the modern astronomical instruments, a precision is achieved equivalent to estimating within a fraction of a per cent., the diameter of a human hair held one hundred and twenty-five feet from the observer.

In a similar manner, the very entertaining history of all ancient units of measurement may be traced, and in each case, is finally resolved into the selection of some common and familiar quantity as the standard, but one which is nevertheless *purely arbitrary*.

About the middle of the last century, it appeared desirable to the scientific mind, to reduce the diverse systems of measurement in vogue by different nations to some common basis, on which all should agree. It was suggested that something *absolute* should be selected, as a standard unit of length, so that if, by any catastrophe all the measures in the world were destroyed, the standard could be unerringly replaced, and from which all other units of every description could be deduced. After much deliberation, it was decided to measure the circumference of the earth and adopt one-forty millionth thereof (about three feet) as the standard. It was argued that the earth was likely to persist, at least as long as the human race was interested in weights and measures, and that this standard could be easily reproduced at any time. So the astronomers went to work, and spent some years in most careful measurement, which resulted in the manufacture of a bar of platinum and irridum about 39 inches long, which was declared to be one-forty millionth of the circumference of the earth. The bar was deposited with great elat in the archives in Paris, and formed the basis of the now widely accepted *metric system*. Some years later, a suspicion arose that errors had been made, and this bar was not after all, one-forty millionth of the earth's circumference, but was a little longer or a little shorter. So a resurvey was made, and sure enough the bar was found to be a minute fraction of a per cent. wrong. Meanwhile, much of the civilized world had adopted the new system. To make any change, even an infinitesimal one, meant enormous expense and confusion. So purely as an *arbitrary convenience*, the old bar, which really has no more claim to absoluteness than the stride of a cave dweller, remains the standard. To all intents and purposes, however, the bar is just as good as if it were exactly the forty millionth of the earth's circumference. Only it must be remembered that scientifically speaking, all units of measure are *pure convention*, and are authoritative only as matters of mutual agreement.

Electricity now plays a most prominent part in the affairs of men, and the future is likely to see its scope very largely augmented. For years it has formed the basis of, or aided in all sorts of commercial transactions. Methods of measurement therefore must be devised whereby the amount of electricity, and its other proportions (if any there be) can be estimated, in order that both vendor and purchaser shall receive just and fair treatment. But it might be argued, as electricity is not a thing, you cannot sell it by the bushel, the pound or the foot. Very true, but there are hosts of commercial transactions in imponderables, to which bushels, pounds and feet do not apply, and yet for which accurate methods of measurement have been devised, are constantly used, and are well recognized even by the courts. Millions of incandescent lamps are sold as "16 candle power." But light cannot be weighed, or estimated by the foot or quart. It is as imponderable as, and in some respects, more elusive than electricity. Yet the candle-foot, or light given by a candle set one foot from an object, is as definite a unit, and means as much to the incandescent lamp maker, as a ton of glass for the bulbs. The telephonist who runs his exchange on measured service basis, *sells service*, that is, he puts people into talking relations with each other, and the prominent question now under discussion is a proper *unit of measurement*, fair alike to company and subscriber. The most common transaction in an imponderable, is in *time*. Duration cannot be estimated in feet, pound, quarts, candle power, etc. Yet there is no form of measuring apparatus that is more common or more accurate than the watch or clock, no measurements that are more universally or more frequently made, and none which so constantly involve every act of life.

Part of the seeming mystery surrounding electricity is due to unfamiliarity. To many of us, in whose college days the only electrical experiment consisted in putting a comrade on an insulating stool and watching his hair rise, the arc is an astonishment, a glow lamp a mystery, the telephone indescribable, and the flash of the trolley wheel a gleam from the eye of one of Dr. Holmes' witches. But electricity is as real as light, and can be measured and evaluated with infinitely more ease and exactness; but as it obeys different laws, and is amenable to different conditions and processes, it must be studied for itself, and with instruments and methods devised which are appropriate to its peculiar nature.

Analogys are said to be dangerous, and certainly are, if used further than to aid the mind to form a mental conception or picture, of the phenomena under consideration. So in the illustrations to be used to picture what we consider *may* be the probable nature of electricity, from the observed effects of its

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Editor's Note.—This is the first of a series of articles by Mr. Abbott on this subject. They will continue for about a year.

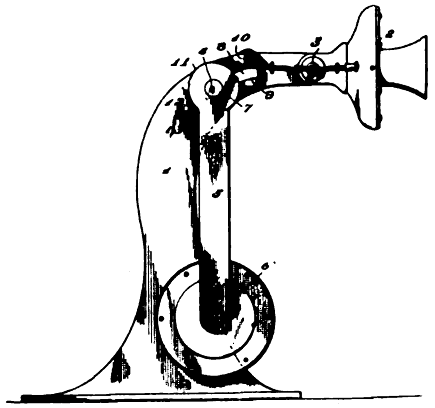
presence, it must never be forgotten that electricity is, in no sense of the word, a material substance like water, any more than light is, but like light, sound, heat, chemical action and attraction, is one of the forms of energy. Nevertheless, electricity acts under so many circumstances in exactly the manner that water does, that it is quite an aid, often times, to picture it as a kind of fluid, that traverses a wire in much the same fashion as water runs through a pipe. Of one thing, however, we may be quite certain, that wherever the electricity *is*, it is *not in* the *wire*, though it is now considered probable that it is largely on the outside of it.

Consider a hogshead full of water, from the bottom of which extends a rubber pipe or hose. Suppose the pipe to be open at its remote end, the water will flow out. Now if the water is to be sold, the first question is *how much* will run out? As a matter of experience, we know that if the hogshead is deep, it will not only contain a greater quantity of water, but the *pressure* of the water on the bottom will be greater. It is also a matter of experience that through any given pipe, more water will flow with a large pressure than with a small one. We also know that with any given pressure, a large pipe will carry more water than a small one, and that a rough pipe will obstruct the flow more than a smooth one, and so deliver less water in any given time. Therefore there are three quantities involved in the flow of the water. First, the pressure of the water in the tank tending to make it run out of the pipe; second, the resistance of the pipe tending to obstruct the flow and third, the amount delivered in a given time. If any two of these are or can be measured, the third can be found. Suppose it be ascertained by experiment, that with a pressure of two pounds per square inch on the bottom of the tank, one gallon of water per minute will flow through a pipe twelve feet long and one inch in diameter. Now suppose four gallons of water per minute are required, how shall they be obtained? The pressure of the water in the tank causes the delivery of a certain quantity against the resistance to flow offered by the pipe. Increased flow can only be secured by increasing the pressure or decreasing the resistance of the pipe, or a combination of both. The latter can be accomplished by making the pipe shorter or larger or smoother. In the example it is required to increase the delivery four times. This may be done, first, by increasing the pressure four times, which will force four times as much water through the same pipe; second, by cutting the pipe off to three feet in length thus taking away three-fourths of the resistance; third, by making the diameter two inches instead of one, thus making its area four times as great, and allowing it to carry four times as much water; and fourth, by making the pipe of some other material, so that there will be only one-fourth as much friction between the water and the pipe, thus decreasing the opposition to one-fourth of its former amount. To state these principles in scientific language, we say that the quantity of water delivered is directly proportioned to the pressure of water in the tank, and inversely proportioned to the resistance of the pipe. This last statement can be expanded to read that the resistance of the pipe is directly proportional to its length, and the roughness, or friction of its walls, and is inversely proportional to its cross sectional area. So if by experiment we find out what amount of water under a pressure of one pound will flow through a pipe one foot long, one inch in diameter and of one unit of roughness in one minute, we can at once determine how much water will flow through any other kind of pipe under any other circumstance.

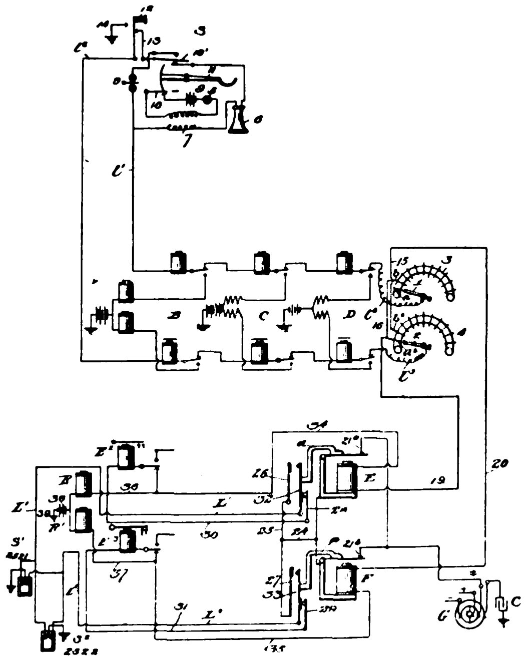
Now electricity is not measured in gallons, but in every electrical circuit there seems to be a transfer of electricity from one point to another, and this amount of electricity can be measured in units of electrical quantity, just as water is estimated in units of water quantity, or gallons. Every electrical circuit offers a certain *resistance* or *opposition* to the transfer of electricity, just as the pipe offers an opposition to the water. Experiments show that this resistance is directly proportionate to the length of the circuit, and to a kind of inherent opposition that can be called *electrical friction;* and inversely proportional to the cross section of the circuit. Thus a wire attached to an electrical machine, behaves exactly as if it were a pipe carrying a current of water, and the action of the circuit can be calculated by similar laws. So in all electrical problems there are three quantities. The electrical pressure, the electrical quantity and the electrical resistance; if any two of these are known, the other can be calculated. Indirectly the solution of such problems lead to very interesting results, such as the location of the point many miles from an exchange where a toll line is broken or grounded, etc., and in succeeding papers these questions are to be discussed.

Patents

Thomas C. Knowles, of Denver, Colo., patents (No. 717,218) a telephone transmitter. This invention is an improved method of attaching the receiver to the sub-station instrument. It is apparently limited to such sub-station instruments as are equipped with a solid transmitter arm. In the diagram, 1 is the ordinary curved arm to which a second movable arm is attached, swinging on the pivot 4. This arm carries the receiver. A lug 8 bears upon a movable projection 9, which serves the purpose of the ordinary hook switch. The switching mechanism is concealed inside of the arm 1. The chief merit of this invention lies in obviating the flexible receiver cord.



William R. Binkley, of New Bedford, Mass., patents (No. 717,327) an automatic electric exchange system. The object of this patent is to produce a system of party line signalling that is adapted to automatic exchanges, notably the Strowger system. The inventor equips each automatic exchange with a special ringing generator G adapted to give alternating current and positive and negative pulsating current. Each sub-station is further provided with two special ringing relays. By means of the selector mechanism, common to the Strowger system, any subscriber is enabled to operate the special ringing relays on other subscribers' lines and transmit to each bell only that kind of current to which it will respond.



The Week's Messages.

NEW COMPANIES.

FRANKFORT, IND.—The Central Energy Telephone Company, of Frankfort, has been incorporated with $50,000 capital. The directors are David A. Coulter, Eli Marvin and James McClamrock.

HAZLETON, IND.—An Independent telephone company is being organized here. The Cumberland Telephone and Telegraph Company has a fairly large number of subscribers, but the poor service rendered and high rates has caused universal dissatisfaction among its patrons. The leading business men of the city will form the board of officers and the stockholders. Material will soon be purchased for the construction of a system.

VERNON, IND.—The stockholders of the Naylor & Vernon Telephone Company met at Hyde recently and organized by electing the following officers: President, W. R. Naylor; secretary, C. L. King; treasurer, Mr. Cosby.

ST. ANTHONY, IA.—The Teton Telephone Company, of St. Anthony, has been incorporated with a capital stock of $100,000.

MARION, KAN.—The Southwestern Telephone and Electric Company has been incorporated with a capital stock of $25,000.

SAVANNAH, MO.—A new telephone company has been lately organized under the name of the Nodaway Valley Telephone Company, which will connect with the Mutual, at this place. The line will start in Nodaway County and connect with the Eureka line.

ALBANY, N. Y.—The Commercial Union Telephone Company has been incorporated with the Secretary of State to build and operate lines in the counties of Rensselaer, Saratoga, Washington, Warren and Essex and elsewhere in the State. The capital stock is $10,000.

PERRY, N. Y.—The Perry Telephone Company has been incorporated to construct a line to connect the towns and villages of Wyoming County. Capital, $10,000. Directors, C. M. Perry, Lloyd P. Benedict, C. W. Smith, of Perry.

CADMUS, OHIO.—A movement is on foot under the leadership of I. H. Champer, of Patriot, for the organization of a telephone company to connect the two villages and establish rural service in the adjacent neighborhood.

SOMERSET, PA.—The Somerset Telephone Company has been incorporated with a capital stock of $120,000. Treasurer, Harvey M. Berkley, Somerset; directors, E. Milton Beachley, Myersdale; Fred W. Biesecker, Josiah Swank, Harvey M. Berkley, Somerset.

MICA, WASH.—The Richland Telephone Company has been organized for the construction of lines to neighboring towns. J. A. Crisler, president; W. E. Dunn, general manager.

MT. VERNON, WASH.—The Mt. Vernon Rural Telephone Company has been organized to construct and operate a telephone line from Ridgeway to Mt. Vernon. A line will also be built to La Conner.

MOUNT IDA, WIS.—The Morley Telephone Company, of Mount Ida, has been incorporated with a capital stock of $800; incorporators, Sylvester Frey, August Walner and H. A. Monteith.

FINANCIAL.

ELKHART, IND.—The Home Telephone Company, of Elkhart County, has increased its capital stock from $100,000 to $160,000.

MOLINE, ILL.—The Union Electric Telephone Company has asked the return of the $5,000 bond filed for the completion of its plant here, claiming that the conditions have been fulfilled.

CLARION, IA.—Amended articles of incorporation have been filed by the Clarion and Northwestern Telephone Company increasing the capital stock from $10,000 to $20,000.

DUBUQUE, IA.—By filing a trust deed for $25,000 with County Recorder McGovern, the Dubuque Telephone Company practically bonded its plant in Dubuque County to this amount. The deed is a voluminous one and in it are set forth the conditions upon which this action is undertaken, and also that C. H. Eighmey, president of the First National Bank, is to act as trustee. The deed is signed by Vic Stevens, president of the company.

LEXINGTON, KY.—At a meeting of the board of directors of the Fayette Home Telephone Company it was decided to offer for sale $100,000 worth of bonds. They will be placed on the market at once.

GRAND RAPIDS, MICH.—The board of directors of the Citizens' Telephone Company held a meeting and declared the regular quarterly dividend of 2 per cent., payable January 20th. It was the twenty-second regular quarterly dividend. It was decided to begin at once the construction of thirty miles of important toll lines. The line from Portland to Lansing, which was begun recently, it was announced would be in operation within sixty days. Secretary E. B. Fisher reported 4,901 Citizens' telephones in operation in Grand Rapids and that an increase of sixty-two telephones had been made in December. The new building of the company will be hurried to completion as fast as the weather permits. The concrete foundation is all in and material for continuing the work on the superstructure is on hand. The Citizens' Telephone Company, of Jackson, which is closely allied to the Grand Rapids Citizens' company, was reported as having in operation 1,201 telephones.

JACKSON, MICH.—The People's Telephone Company has increased its capital stock from $200,000 to $250,000.

ST. PAUL, MINN.—State Treasurer Block has received $1,469.06 on the gross earnings tax of the Independent telephone companies of the State. The following corporations made payment: People's Company, Chatfield, $545.15; Fairmont Telephone Company, $445.20; Rochester Telephone Company, $250.15; Northland Telephone Company, Duluth, $63.60; Glenwood Telephone Company, $38.39; Madison Telephone Exchange, $32.73; Fosston Telephone Company, $22.15; Glenville Telephone Exchange, $18.82; Scott County Telephone Company, Jordan, $16.49; Nicollet County Telephone Company, Bernadotte, $15.80; Jordan Telephone Company, $12.20; Lake Park Telephone Company, $8.38.

SAVANNAH, MO.—The Andrew County Mutual Telephone Company, of Savannah, has filed articles showing that it has increased its capital stock from $5,000 to $10,000.

OMAHA, NEB.—The directors of the Interstate Independent Telephone Company met recently to consider a proposition to finance the company by a Chicago promoter. President A. A. Wright stated that he could not say what the outcome of this conference would be, but that, regardless of what was done in this instance, the new company would, in the near future, perfect plans for the installation of an up-to-date exchange in this city, to cost not less than $50,000.

ONTARIO, N. Y.—A certificate of increase in the capital stock of the Ontario Telephone Company from $20,000 to $40,000 has been filed in the county clerk's office. The certificate states that the places to be connected are: Scriba, New Haven, Mexico, Pulaski, Richland, Sandy Creek, Volney, Schroeppel, Hannibal, Granby, Lysander, Clay and Salina.

INDIANOLA, PA.—The Indiana Telephone Company has increased its capital stock from $20,000 to $40,000.

NASHVILLE, TENN.—At a meeting of the directors of the Cumberland Telephone and Telegraph Company, held at Hopkinsville, the directors were authorized to increase the capital stock from $10,000,000 to $20,000,000, the additional amount to be used in improving the company's property.

WAUSAU, WIS.—The Wausau Telephone Company has just paid to its stockholders a dividend of 10 per cent. This, with a 6 per cent. rebate on rentals, makes a total of 16 per cent. that has been paid during the year.

RATES.

WARWICK, N. Y.—At a meeting of the Warwick Valley and Highland Telephone companies recently it was agreed that hereafter the rate for toll messages over those lines, to or from any point on either system, excepting Cornwall, should be 10 cents. The rate to and from Cornwall is 15 cents. The rate from any point on the Warwick system to Chester is 10 cents, to

THE WEEK'S MESSAGES Continued.

Newburgh 20 cents. As soon as connection is made with the Middletown system, a low rate will be named between Goshen and Middletown and the rest of the county. A directory containing all the names of subscribers for Independent telephones in Orange, Sussex and Dutchess counties will be issued before long.

ELECTIONS.

HARDIN, ILL.—The directors of the Calhoun Telephone Company met recently in Hardin and elected new directors as follows: S. A. White, C. H. Lamar, L. A. De Long, McC. Johnson and S. J. Merida. A 9 per cent. dividend was declared. The company is making efforts to complete a new line from Batchtown to Grafton. When completed a metallic circuit will be established, with direct communication to St. Louis via Grafton.

FRANKFORT, N. Y.—At the annual meeting of the Frankfort Hill Telephone Company John E. Maynard was elected chairman and S. P. Weaver secretary. There was a manifest disposition on the part of the company to improve the service over that heretofore had and an effort in that direction will be made at once. Officers were elected for the ensuing year as follows: President, T. P. Parker; secretary, S. P. Weaver; treasurer, H. H. Ingham; general manager, C. W. Wetmore. A resolution was passed assessing each member $2, to be used for such improvements as may be necessary and paying the bill of the County Telephone Company for service during 1902.

LITTLE FALLS, N. Y.—The stockholders of the Interstate Telephone Company held their annual meeting at the company's offices in this city recently. The following directors were elected: Eugene Walrath, John Hurley, Walter Stafford, of Little Falls; G. B. Beardslee, of East Creek; A. P. Roth, of St. Johnsville, and George Hakes and George Tuttle, of Mohawk. The above directors subsequently elected Eugene Walrath president and John Hurley vice-president. The report of Manager Hakes showed that 400 telephones had been installed during the past year and that 700 are now in operation.

NORTH GAGE, N. Y.—At the annual meeting of the Farmers' Mutual Telephone Association the following officers were elected for the ensuing year: President, Charles James: vice-president, Henry Coffin; secretary, Millard Cruikshank; treasurer, Omer Brayton; directors, James Fuller, Samuel Baird and Elmer Coonradt.

ROME, N. Y.—The annual meeting of the Rome Home Telephone Company was held at the office of the company in this city last week. The following directors were elected: John S. Wardwell, Fred M. Shelley, John E. Mason, William J. Grogan, James S. Brailey, Jr., Theodore M. Bush, Irving H. Griswold. The change in the directorate means that Messrs. Bush and Griswold, whose home is at Elyria, Ohio, and associates have acquired a large interest in the local telephone company, and that several improvements will result, particularly in the way of affording long distance connections. As soon as the Utica Home Telephone system is in operation, which will be within a few months, connection will be made with the Rome system. Other connections throughout the State also will follow. Messrs. Bush and Griswold now are constructing a long-distance line between Albany and Buffalo, and the places along the route soon will have long-distance connection with the Rome Home Company. The following officers of the Rome company have been elected for the ensuing year: President, F. M. Shelley, Rome; vice-president, John S. Wardwell, Rome; treasurer, James S. Brailey, Wauseon, Ohio; secretary and manager, Daniel M. Hall, Rome. The Home company began the present year with 905 telephones in use in Rome and the number of subscribers is increasing every day.

SYRACUSE, N. Y.—At the annual meeting of the Syracuse Telephone Company these directors were elected: J. J. Jermyn and Dr. John L. Wentz, of Scranton, Pa.; Rollo G. Jermyn, Arthur R. Peck, Ernest I. White, H. W. Plumb, Harvey A. Moyer, A. A. Howlett and Herman Bartels, of this city. Mr. Moyer and Mr. Bartels were elected to take the place of two Scranton directors. The election of officers resulted as follows: President, J. J. Jermyn; vice-president, A. A. Howlett; secretary and treasurer, Dr. John L. Wentz; general manager, Rollo G. Jermyn.

WARREN, O.—The Warren & Niles Telephone Company has elected the following directors: Washington Hyde, Jules Vautrot, C. B. Selby, G. B. Devoe, C. W. Devoe, C. C. Clawson. The year has proved a prosperous one, the earnings being turned back into the treasury to apply on its bonded indebtedness. The company now has 935 telephones in Warren, 400 at Niles and Mineral Ridge and 100 scattering. The iron wire lines will be replaced with copper wire.

YORK, PA.—The annual meeting of the stockholders of the York Telephone Company was held recently in the office of the company's exchange. D. F. Lafean was made president of the meeting and H. H. Weber acted as secretary. The following board of directors was elected: Daniel F. Lafean, John McCoy, C. C. Frick, H. H. Weber, George B. Rudy, Harry S. Wiest, Dr. William S. Eisenhart. The board met immediately afterward and organized as follows: President, Daniel F. Lafean; vice-president, John McCoy; secretary, H. H. Weber; treasurer, C. C. Frick; general manager, George B. Rudy; attorney, George S. Schmidt; finance committee, D. F. Lafean, John McCoy, H. H. Weber.

COMPETITION.

WAPAKONETA, O.—The Minster Home Telephone Company, of Minster, this county, with F. J. Maisen, of this city, general manager, has just completed and fully equipped a telephone plant and exchange with 75 telephones working. This company was organized to oppose the Bell Telephone Company, which has had an exchange in Minster for ten years, with ten telephones.

COMBINATIONS.

KNOX, IND.—The Knox Telephone Exchange has been sold to a Mr. Tomlinson, of Winchester, Ind. It is reported that Mr. Tomlinson is the purchasing agent for an Independent telephone system and that the exchange in Winamac and other towns in this part of the State have also been purchased by this company. Knox is to be the headquarters for Northern Indiana, and the officers of the association will live there.

WINAMAC, IND.—Winchester parties have been negotiating with W. R. Lowe for some time concerning the purchase of his Winamac telephone plant, including his interests in toll lines to neighboring points. Mr. Lowe finally made an offer of his whole interest for $12,000, which was accepted.

WINCHESTER, IND.—The Winamac, Kewanna and Knox telephone plants have been sold to a Winchester syndicate, headed by J. L. Thompson, which will buy a good many of the Northern Indiana exchanges.

SCOTTSVILLE; KY.—The Gainesboro Telephone Company has closed a deal for the Independent Telephone Company's property, which extends from here via Bowling Green and Cave City to Glasgow, Ky., owned by George T. Tucker, of Cave City. The Gainesboro company has its employees at work in the local exchange. They will soon make extensive repairs on this new property.

GREENFIELD, MO.—Aaron D. States has purchased all the telephone property hitherto owned by John O. Mitchell. Mr. States has consolidated the Mitchell lines with the Interurban lines, connecting the Mitchell lines at this place with his Greenfield exchange, thus giving a complete Dade county service to all subscribers, the combined systems reaching to every nook and corner of the county. A new 100-drop switchboard bought by Mr. Mitchell for his proposed exchange in this city has been added to the Interurban exchange and is rapidly being filled.

BINGHAMTON, N. Y.—The Binghamton, Cortland and Syracuse Telephone companies have been consolidated with several other companies in the State and are now known as the York State Telephone Company. The cities are being connected as rapidly as possible with trunk lines and it is expected soon to have a system nearly covering the State. The line from Cortland extends as far as Lisle and the extension from Binghamton will meet it in about three weeks, completing the line to Syracuse. A gang of about twenty men, who have been working up from Binghamton by way of Chenango Bridge and King street, have already reached Pease's crossing about a mile below the village. This company already has 1,300 telephones in Binghamton and a village system is to be put in at Whitney's Point. Connections will also be made with the farmers' line at the latter place and at Chenango Bridge, giving a very complete and satisfactory service.

SNYDER, TEXAS.—J. E. Murphy, of Knapp, has bought the Local Telephone Exchange for $1,500. Mr. Murphy will make his residence in this city.

FRANCHISES.

HOWELL, IND.—William McGregor & Co., of Vincennes, Ind., have asked for a franchise to construct and operate a telephone system here. Brad McGregor was in Evansville recently making arrangements with some local moneyed men to take stock in the Howell system, in which he was successful. The Howell company will be capitalized at about $40,000.

MT. VERNON, IND.—The city council at a recent meeting granted a franchise to William McGregor & Co., of Vincennes, Ind., to construct and operate a telephone system in this city. Charles McGregor, the engineer of the company, says the franchise will be accepted and work commenced immediately. The McGregor company now has lines in use in various parts of Posey County and a line from here to New Harmony. Materials will soon be purchased for the construction of a large exchange here to connect with the lines already in use and furnish a local service. Connections will also be made with all Independent companies in Southern Indiana.

KEWANEE, ILL.—H. C. Dodge, representative of the American Electric Telephone Company, is here from Chicago to file his bond and the company's acceptance of the franchise granted by the city council recently.

PONTIAC, ILL.—Ray Blasdel, representing local capitalists, has asked the city for a franchise to construct and operate a telephone line within the city. Mr. Blasdel states the company will put in an up-to-date system in every respect, and the service will be the best possible to provide; that the rates will be considerably less than those now being charged for a mediocre service.

THE WEEK'S MESSAGES—Continued.

LAWTON, KANS.—The Texas Telephone Company has asked for a franchise in Lawton. L. F. Wilson, of Kansas City, is vice-president and C. B. Felder, of Wichita Falls, Tex., general manager.

ATTLEBORO, MASS.—Should the Taunton Telephone Company succeed in securing a franchise to erect poles and run wires through Attleboro, it is planned to erect a beautiful central station on the east side.

LAKEVILLE, MASS.—The Taunton Telephone Company will ask for a franchise here.

STILLWATER, MINN.—The Consolidated Telegraph and Telephone Company will again make application for permission to extend its lines through the city from the Atwood A to the Atwood B mill. Several similar applications for a foothold in Stillwater have been turned down by the council.

GRAND FORKS, N. D.—H. E. Soesbe, representing Chicago capitalists, has asked the city council for a telephone franchise. His proposition is to put in a telephone system, using the latest and best equipment, construction work to be begun within ninety days after the ordinance granting the franchise is accepted (the same to be accepted within ninety days after its passage and approval) the system to be constructed and in operation with 200 telephones in eighteen months after acceptance of franchise; the rate for telephones to be $2.50 per month for business houses and $1.50 per month for residences. All instruments will be long-distance telephones. As a guarantee of good faith, $2,000 will be deposited with the city to be forfeited in case the system is not constructed and in operation within the time above mentioned. When construction work is commenced $1,000 in cash will be deposited with the city as a guarantee that damage done to streets, sidewalks, etc., will be made good, and if such damage is not promptly repaired, the city has the right to do so and reimburse itself from this cash deposit, the telephone company to keep the deposit up to $1,000 at all times. He will also give bond to the city in the sum of $5,000 to indemnify it against all liability by reason of injury to persons or property occurring through any negligence in the construction of the system. In addition to the foregoing and as a consideration for the grant of the franchise, this company will pay the city two per cent. of its gross receipts payable quarterly in each year, the city officers to have access to the books of the company to verify its statement of gross receipts. The Twin City Telephone Company, of St. Paul, Minn., has also asked for a franchise to construct and operate a telephone system.

CINCINNATI, O.—A competitor to the Bell Telephone Company for business in this territory, the Cincinnati Telephone Company, has announced its existence by applying to the board of legislation for a franchise to erect poles, string wires and establish a complete system of telephone service in the city. The new enterprise was incorporated recently with a capital stock of $10,000 and is made up largely of Cincinnati capitalists. The application sets forth the fact that the company has already practically been granted the right to use the streets and alleys of the city by the supreme court and offered a bond of $10,000. The plan of the new company provides for an underground system of wires in the business districts of the city. The application was referred by the board to the committee on telephones, telegraphs and conduits. R. C. McCracken, of this city, is president of the company.

McCOMB, O.—Mr. Cotterman, of Deshler, presented a franchise to the town council recently asking the privilege of establishing a telephone exchange and it was passed on its first reading.

WYTHEVILLE, VA.—The telephone franchise which the town council proposes to give the new Mutual Telephone Company will have to be advertised for sale to the highest bidder under the new constitution. The council had already instructed the town attorney to prepare the contract. Some are afraid that private parties will bid in the franchise, but it is expected that the advertisement will be for a company with stockholders, sharing mutually in the profits and losses.

UNDERGROUND.

PITTSFIELD, MASS.—The city council has passed an ordinance requiring the Berkshire County Telephone and Telegraph Company to lay conduits in certain streets.

CONSTRUCTION.

COLUMBUS, GA.—A new telephone line will be built by the Columbus Automatic Telephone Company. John T. Norman is president.

BAKERS' CORNER, IND.—The Home Telephone Company is repairing and extending its line with cedar poles.

EVANSVILLE, IND.—Mayor Covert and City Attorney Albert Funkhouser have gone to Chicago to make arrangements to buy equipment for the new municipal telephone plant that is to be built here in a short time. It is said the plant will be under headway in the spring. It will cost about $200,000.

SULLIVAN, IND.—The Hayworth Telephone Company has connected its line with the Farmersburg Mutual Telephone Company. The Hayworth company has six miles of line and the following are stockholders: Tom Bennett, Perley Hayworth, Charles Stutesman, Thompson Scott, Thompson Gaskins, Andrew Thompson, Ed Gaskins, William Daugherty, John S. Deal and Bert Wood. Before many days have passed the Farmersburg Co-operative Company will have its lines into Shelburn.

SWEETSERS, IND.—The Farmers' Rural Telephone Company, of Sweetsers now has 100 stockholders. Work of constructing the lines and establishing the exchange will be commenced by January 20th, and it is thought the work will be completed by March 15th. The directors of the company are: J. E. Carey, James Dooley, Thomas Johnson, F. H. Stevens and Alfred Burge.

AURORA, ILL.—The Interstate Telephone Company is installing a new switchboard at Morrison with a capacity of 450 telephones.

FREEPORT, ILL.—The New Telephone Company has added 115 new subscribers to its list and obtained fifty stockholders during the past fifty days. Switchboards, cable and nearly all other material are on hand to complete the work. When the paving was done on some of the streets the New Telephone Company endeavored to get conduit on hand, so as to lay it before the paving was done. It was unable to get it on short notice, and therefore was obliged to use a substitute, in the hope of being able to avoid taking up the new pavement. In subjecting the conduit to a test before drawing in the cables, it has been found that the substitute which was used did not show up as favorably as the other and therefore will be replaced with the standard concrete conduit.

LINCOLN, ILL.—In five weeks Manager Biwer, of the Mutual Telephone Company of Lincoln, expects to be in the new building. There are 70,000 connections to be made.

OGDEN, ILL.—The Farmers' Mutual Telephone Company will erect a line from Ogden to Gifford and Penfield.

PEORIA, ILL.—Senator Evans and E. S. Conklin made a trip to Peoria recently. While there they purchased a site for a modern telephone building in the heart of the city. When completed it will be the permanent home of the Interstate Telephone Company, with headquarters at Aurora.

JEFFERSON, IA.—Arrangements have been perfected by the Greene County Farmers' Mutual Telephone Company for a central office in this city, where its lines will meet from the various directions and where the switching will be done from one line to another.

WELLSBURG, IA.—A new farmers' mutual telephone line is being built by farmers living south and west of Wellsburg. The poles for the new line have been set and the company expects to be ready to give service within a week. The line runs to Wellsburg and will be about fifteen miles in length. The line will have connection with the Cleves line. The new company begins with about fifteen patrons. It is their intention at present to put in a switchboard at Grundy Center.

WELLINGTON, KANS.—W. F. Sikes, proprietor of the Independent Telephone lines, has arranged for the construction of a toll line to Blackwell, connecting with his exchange in this city, with stations at Rome, South Haven, Hunnewell and Braman intermediate. Material has been ordered and construction will be begun within the next few weeks. The Independent systems are being rapidly extended so as to compete with the service given by the Bell company.

NEW IBERIA, LA.—The People's Independent Telephone Company (limited), of this place, has just moved into its new central office. The company at the present time has 300 subscribers connected and new ones are being secured every day. Prospects for the new year are exceptionally bright. R. F. Hogsett is president and general manager of the company and much of the work of transferring the exchange equipment from the old to the new building devolved on him.

CRYSTAL LAKE, MINN.—The Willow Creek Telephone Company has started to set poles from this place to connect with its main line at Watonwan, where it has had a line for the past year.

UNIONVILLE, MO.—J. O. Smith and Mr. Caldwell, managers of the local telephone system, will soon install a new switchboard and construct four additional lines. They have put in numerous new instruments lately.

FORT BENTON, MONT.—Work on the Benton-Highwood Telephone Company's line between Fort Benton City and Highwood will soon be commenced. A stock company will be incorporated by J. M. Burlingame, A. D. Vibbert and others.

ALMA, NEB.—The Farmers' and Merchants' Telephone Company, of this place, is installing its exchange at Orleans with fifty subscribers.

GLEN GARDNER, N. J.—The Farmers' and Merchants' Telephone Company will soon connect the towns of Glen Gardner, High Bridge and White House.

THE WEEK'S MESSAGES Continued.

TRENTON, N. J.—The Interstate Telephone Company expects to increase very considerably its long-distance connections within the next two or three weeks. One of the two lines that are being constructed between this city and Philadelphia on the Pennsylvania side of the river is completed so far as the erection of poles is concerned. The wires are now being put up and General Manager Demarest announces that before February 1st connection will be effected with the Keystone Telephone System in Philadelphia with its 10,000 subscribers and also with the Independent lines throughout Eastern Pennsylvania. One of the two lines between this city and Philadelphia will be direct and the other will extend via Fort Washington, from which point connections will be made with Norristown and the Lehigh Valley. The third line to Philadelphia will follow the New Jersey side of the Delaware. This line will not be in operation until spring. Then connection will be made with the Eastern Telephone system in Camden. During the early summer it is expected that the pole line will be completed that will connect the Interstate's Trenton system with the systems owned by the company in Atlantic City, Millville, Salem, Vineland, Bridgeton and surrounding towns. The Trenton system is already connected by long-distance wires with nearly all the towns in Burlington County. The Interstate now has about 1,100 telephones in Trenton and is putting in new telephones at the rate of about fifty a week.

HIGHLAND, N. Y.—The Southern New York Toll Company is erecting a telephone line from Highland to New Paltz, by way of Clintondale. This will give Kingston connection with New Paltz and Clintondale by the Standard Telephone system, with which the Southern New York Toll Company is allied.

MIDDLETOWN, N. Y.—Representatives of the Farmers' Union Telephone Company were in this city recently in conference with the directors of the Orange County Telephone Company. It is proposed to extend the two systems by making connections, thereby increasing the working ground of the companies. The representatives of the Farmers' company were J. H. Haggerty, president, of Pine Island; C. J. Stanaback, of Sussex, N. J.; R. S. Coursen, of Bullville; F. E. Armstrong, Sussex; N. H. Clark, of Johnsons, and several others. George W. Ballou, of this city, was also present.

TROY, N. Y.—The new Mansfield-Mainesburg telephone line is to be extended to connect with the State Road line to Sylvania and Troy.

UTICA, N. Y.—The County Telephone Company, which has been increasing its capacity in this village, has about completed its repairs. A large force of linemen has been at work and Superintendent McMillan has strung about 12,000 feet of new cable, increasing the capacity of the plant from 875 to 1,225 telephones.

KINDRED, N. D.—An organization of farmers east of Kindred will build a rural telephone line along the Sheyenne River into town, where it will be connected with a local exchange system. Connections will also be made with the long-distance line between Kindred and Davenport. The work will be commenced in the early spring and will give Kindred a fine telephone service.

LEEDS, N. D.—A franchise for the construction of a line from Leeds to Minnewaukan has been granted the Leeds Telephone Company.

CINCINNATI, O.—The Citizens' Telephone Company, of Kentucky, has a large force of men at work erecting poles and stretching wires along the Licking pike to Grant's Lick, where the line will cross the Licking River to the Kenton County side, whence it will be extended to Lexington, Ky.

GEORGETOWN, OHIO.—William Hiler is in Adam County in the interest of the Ohio Telephone Company. He will seek to unite West Union, Blue Creek, Wamsleyville, Otway and Mineral Springs with telephonic connection. Farmers and others residing on the lines will be given an opportunity to connect.

GUYSVILLE, OHIO.—A number of men are at work extending the Guysville Telephone Company's lines. The addition will consist of at least eight new lines, making this company one of the strongest local organizations of the kind in the State.

SALIX, PA.—The Salix Telephone Company has been improving its service to Dunlo and some other towns. A line has also been built from Scalp Level to the new workings of the big coal company and a number of instruments are on the way for installation in Foustwell and at the three mines in that vicinity.

CORSICANA, TEX.—The Corsicana Telephone Company will increase its plant one-third.

TYLER, TEX.—The Globe Telephone Company, of Tyler, has its poles erected from Tyler to Big Sandy and is now stringing wires and will open an office in Winona for long distance accommodation.

LEESBURG, VA.—The Snickersville Telephone Company has decided to extend the long distance telephone line from Leesburg to Bluemont.

ASHLAND, W. VA.—The Ashland Home Telephone Company has opened its toll line connecting Sanborn, Highbridge and Mellen. The new board for the Ashland Exchange has arrived and work of installing will take but a short time. This will give Ashland people one of the finest telephone systems of any city of its size in the country. T. C. Jacks, manager of the new company, is completing arrangements to extend the toll line down the Central to connect with other Independent lines so as to give Ashland connection with other large cities.

CLARKSBURG, W. VA.—Central West Virginia will soon have another telephone system if the plans of Philadelphia capitalists materialize. A representative has been here several days recently looking over the field and quietly obtaining all possible information concerning the system in operation now. His syndicate entertains the idea of putting in a system which will cover all Central West Virginia, and later will be extended to other portions of the State and into sections of Ohio, Pennsylvania and Maryland. It will be an Independent concern, with unlimited capital. The representative hopes to have matters in shape within the next sixty days.

KEYSER, W. VA.—The Piedmont and Keyser Telephone Company is installing a complete central energy system. The company will in the spring build a line to Barnum, Shaw, Blaine and Elk Garden.

LA CROSSE, WIS.—The La Crosse Telephone Company will award a contract for telephone equipment for the La Crosse exchange on the 15th of this month. The ultimate capacity is to be 3,000 lines. Specifications were prepared by Le Roy W. Stanton, consulting telephone engineer of Cleveland.

MISCELLANEOUS

CARLYLE, ILL.—A new telephone system that will connect every town, village and hamlet in Clinton County, is the line upon which States Attorney T. E. Ford is now working. Mr. Ford's plan is to organize a company composed of local capitalists and build a new line connecting every point in the county. It is the intention to put the rate down so low that every one nearly can afford to take a telephone, and every farmer will have one in his house.

PEKIN, ILL.—The new telephone line, which has been in course of construction by the Pekin Telephone Company between this city and Lacon for several weeks, has been completed. Chillicothe, Spring Bay and East Peoria are on the new line.

GAS CITY, IND.—The Home Telephone Company, of Gas City and Jonesboro, is now in operation. It is expected that long distance communication will be opened soon between Gas City and a number of other towns of the State, including Indianapolis. With the Jonesboro exchange in operation in a few days 350 subscribers will be using the new service. R. D. Haymaker is manager of the new company. Free service will be established between the two cities and Marion and Upland.

MUNCIE, IND.—The stockholders of the Delaware and Madison Counties Telephone Company have been notified by President W. E. Hitchcock that the first annual meeting will be held at Anderson in the company's offices on the first Monday in February.

OLDS, IA.—The Olds Telephone Company has purchased a new switchboard and has it in use.

LONACONING, MD.—The Western Maryland Telephone Company has begun operations in Lonaconing and the initiatory service in eminently satisfactory. The instruments are all of the latest improved patterns. G. W. Randall, of Cumberland, is general manager for the new company.

CHARLOTTE, MICH.—The Citizens' Telephone Company of Grand Rapids, has just finished stringing two copper metallic lines from Battle Creek to this city. This gives the local company copper metallic lines to Jackson, Marshall and intermediate points.

JACKSON, MICH.—The committee of citizens appointed by a recent mass meeting through its chairman to deal with the telephone situation, met at the Jackson City Club recently and heard the representations of the Michigan Bell Telephone Company and the Citizens' Telephone Company. The Bell company had four men before the committee, and the Citizens' company two. Each side was before the committee an hour and a half. The committee unanimously adopted a report, which read about like this: "After listening to the representations of both the Michigan Bell Telephone Company and the Citizens' Telephone Company, we would recommend that each company be granted unrestricted privileges to complete and operate their exchanges and thus allow each company to demonstrate the right to exist."

GRANVILLE, N. Y.—The Granville Telephone Company has given its subscribers in the corporation of Granville and Middle Granville free service with Whitehall, Poultney, South Poultney, Fair Haven, Castleton and Hydeville.

DURHAM, N. C.—The Inter-State Telephone Company's plant in this city has been totally destroyed by fire. The loss is placed at $8,000.

ASHTABULA, O.—The Ashtabula Telephone Company has its new plant in full operation. For several weeks the company has been gradually effecting a transfer from the old exchange to the new, and now the service under the new regime is complete. The company has erected a three-story building and uses the entire third floor, which includes a general business office, directors' room, reception room, operating room and toll room. Miss

THE WEEK'S MESSAGES Concluded.

Mame Sayle, who was chief operator at Sandusky, was engaged to take charge of the exchange at Ashtabula. The exchange employs from fourteen to sixteen operators, and the girls have a retiring room with lockers for each. A relief system has been started which will give the operators a rest period each day. The terminal room of the exchange is on the second floor in the rear.

BELLEVUE, O.—W. M. Halliday, C. R. Callaghan, Frank A. Knapp and D. Calhoun have purchased the interest of Jay F. Laning in the Local Telephone Company, which owns a large number of exchanges and toll lines in Northern Ohio. Bellevueans thus become the owners of nearly all the stock. Mr. McConnell, of New London, and John Beattie, of Norwalk, still retain interests. W. M. Halliday holds the largest block of stock. The office of president, which became vacant by reason of Mr. Laning's retirement, was filled by the election of C. R. Callaghan. Mr. Halliday was elected to succeed Mr. Callaghan as vice president, and Sol. M. Wolf succeeds Ford Laning on the board of directors. Frank A. Knapp continues as secretary. The general office of the company has been here since the first of November.

TOLEDO, O.—The Toledo Home Telephone Company has the homes of fifty-four farmers and gardeners connected with the 5,400 main line telephones now used by its city subscribers. The farm houses, which have the means of almost instantaneous communication with the city, are scattered for eight miles out through the country. The Home Telephone Company has over a hundred applications from other farmers, but as General Manager Hamblin states, the rush of city work is so great that the country service cannot be extended until spring, when weather conditions are more favorable, and the work in the linemen's department will have decreased.

READING, PA.—The Boyertown exchange of the Consolidated Telephone Company has been opened simultaneously with the opening of the Hamburg exchange.

PERSONAL

TRAER, IA.—Earl Richardson, of New Hartford, has been appointed manager of the Traer exchange of the Cedar Valley Telephone Company.

BRIDGETON, N. J.—Mr. H. V. Tinner, who has acted as general manager in this section for the Inter-State Telephone Company for some time, has resigned his position and has left for his home in Hazleton, Pa.

ROCHESTER, N. Y.—C. E. Stinson, the general manager of the Rochester Telephone Company, has resigned. No one has been appointed to fill the vacancy.

POTTSVILLE, PA.—George B. Wright, who for some time held the position of superintendent of the Shamokin District of the United Telephone and Telegraph Company, has been transferred to Pottsville as superintendent of the Schuylkill District.

AN ILLINOIS COMPANY GROWS

THE Streator Independent Telephone Company, of Streator, Ill., started in operation July 1, 1901, with about 280 subscribers and when the exchange was turned over to the management of Mr. A. Schuler, the first of September, 1901, it had over three hundred telephones. It has expanded beyond all expectations, as the officers of the company only thought to get about 400 subscribers in Streator. The capital stock of the company was increased recently from $60,000 to $100,000, and it has put in thousands of feet of new cables all over the city. It has taken out hundreds of small poles which were originally set and put in higher and heavier poles to give room for the extra wires which are required. The company has built about sixty miles of lines in the country the past summer and has put in about eighty telephones for farmers.

A new switchboard has just been installed with a capacity of 1,500 telephones. There are now seven hundred and twenty telephones connected and orders ahead for 29 more.

The company expects to put in an exchange at Grand Ridge immediately and build lines to all the farmers in that section. Mr. Schuler states that he expects to put up thousands of feet of new cables this spring, and that it will take about $50,000 more to adequately supply the people of Streator and vicinity with Independent telephones.

TRADE NOTES

Raber & Watson, dealers in cedar poles, Chicago, are sending out a handsome desk calendar to their patrons. The calendar is made to stand on a desk and is arranged with a roller, so that it may be used indefinitely.

The F. Bissell Company, Toledo, Ohio, has a new test connector on the market made from lumen metal which does not corrode. The screws are threaded into the lower half and are further provided with hexagon lock nuts.

G. M. Gest, the conduit contractor of Cincinnati and New York, has been awarded the additional contracts for placing underground the remainder of the overhead system of the Brooklyn Heights Railway Company. These contracts amount to nearly $40,000.

The Eureka Electric Company, of Chicago, has just closed a contract with the Wagoner Telephone Company, of Wagoner, I. T., for a 600-line trunking switchboard system, with automatic signals and local talking circuit with 400 lines installed. This will be one of the most complete and finest exchanges in that section of the country.

John A. Roebling's Sons Company, of Trenton, N. J. are sending their patrons and friends a handsome calendar for 1903. The calendar bears a picture of the new suspension bridge being built across the East River connecting the boroughs of Manhattan and Brooklyn, N. Y. It is taken from the top of one of the steel towers and shows the enormous steel cable spans, and part of New York City in the distance.

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

INVESTMENT OPPORTUNITY.—Telephone plant, 1 year old, 195 subscribers, 85 miles toll lines in booming town, 4,000; connections with Independent long-distance lines in view. Good reason for selling out. Address A, care of American Telephone Journal, N. Y.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

A COMPETENT MAN to take charge as Manager of a 200-subscriber telephone exchange. Position permanent on merit. Address Box 212, Milford, Indiana.

TELEPHONE SUPPLY SALESMAN with 15 years' experience as superintendent construction, manager operating department, right of way buyer, and salesman and installer of pay stations in U. S. and Canada, will be open for position January 15th. Address G. N. J., care The American Telephone Journal, New York.

POSITION WANTED by strictly temperate man, 25 years old, with seven years' experience in Independent and Bell systems. Experienced in all branches of work. References from former and present employers. South preferred. Address EXPERIENCE, care American Telephone Journal, New York.

I WANT the exclusive handling of an account, for Chicago trade, beginning January 1st. Manufacturers' Agency basis. Address Salesman, care American Telephone Journal, Monadnock Building, Chicago.

FORMER assistant exchange manager in charge of 2,900 subscribers, New York City, is open for position. Age 29, technical graduate, broad business experience. Address R. A. D., care The American Telephone Journal, N. Y.

The American Telephone Journal

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FINAL OVERTHROW OF THE BELL-BERLINER CLAIMS

By Charles C. Bulkley

THE decision of the U. S. Circuit Court of Appeals, handed down last week in Boston, disposes for all time of the Berliner patent as a menace to the Independent telephone industry. It wipes out entirely Mr. Berliner's claims to any share in the development of practical telephony. It leaves him a mere theorist, and confines his invention to the production of speech transmission for which there never was and never will be any use. It shows conclusively that the Bell Company in buying his invention acquired something that had neither scientific nor commercial value, though it may have served admirably as a bugaboo to frighten timid investors. Even its usefulness in this limited field is now destroyed by the court at Boston, for the decision handed down is a complete and sweeping victory for the defendants—the Independents. The court holds not alone that there was no infringement in the case in which suit was brought by the Bell against the National Telephone Manufacturing Co., but that there could be no infringement in the case of any person manufacturing commercial telephones, and this for the very simple reason that it would be impossible for any one to produce a practical instrument under the Berliner specifications.

From some of the comments of the lay press upon the decision in the case, it would seem that the Bell Company, pursuing its usual tactics, is strenuously endeavoring to discount the effect of the decision as much as possible.

These press notices with singular uniformity state that the court declared the patent valid but held the transmitters used by the defendants were not infringements. This is not so. As a matter of fact the court held the patent absolutely invalid for any practical purpose whatsoever. The Berliner patent shows and describes *metallic* contacts constantly held in contact, and the court finds that if the patent is specifically limited to metallic contacts it is valid, but that if stretched beyond mere metallic contacts it is absolutely void and of no force or effect.

Now, as a matter of fact, no telephone has ever been made commercially, having metallic contacts. Such contacts are wholly impractical and uncommercial. The old form of Blake transmitter was provided with carbon contacts and such contacts are absolutely essential to obtain any practical results.

The Hunnings, or granular form of telephone transmitter, such as is now generally in use, and which has always been used by all Independent companies, also uses carbon.

The court finds that the carbon electrodes were first discovered and patented by Edison in the fall of 1877, prior to Berliner, "and that the carbon electrode is found in every commercial battery transmitter."

"This discovery," continues the court, "represents the first marked advance in the transmitter art since the 1876 Bell transmitter," and further, "that Edison's discovery of microphonic action solves the problem of a variable resistance transmitter, whereby speech may be transmitted long distances."

The patent which was granted to Edison for the carbon transmitter and sold by him to the Western Union Company has long since expired, and his discovery or patent is now public property.

The present form of granular transmitter, known as the Hunning's type was covered by a patent to Hunnings and assigned by him to the Bell Telephone Company. But this patent also expired several years ago, so that the improved and commercial form of telephone, which has always been exclusively used by Independent companies, is open to the public and may be freely used and manufactured by any one.

It is, therefore, absurd to say that the decision is a "practical victory" for the Bell Telephone Company, when the decision limits the claim of Berliner to a transmitter having metallic electrodes, such electrodes never having been used and which are entirely impractical for any purpose.

The decision is clean cut, and leaves the Bell Company not a leg to stand on so far as the Berliner patent is concerned, for there can be no further appeal.

SOME STEPS IN THE EVOLUTION OF CIRCUIT DESIGN
ARTICLE VIII.—THE METALLIC TWO-POINT PLUG AND JACK SYSTEM

By J. C. Kelsey

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WHILE this system can hardly be regarded as an advance, it is so largely used for small boards and in toll line service as to warrant description. The method of operation is the same as in other local battery systems, with manual drops. The principal difference lies in the busy test. Nearly all toll boards are multipled when business is sufficient to require more than one operator. Assume an 800-line board, requiring eight operators, with toll business enough for two positions placed beside the local operators. This means a board of five sections, with answering jacks on eight of the operators' positions and toll lines ending in drops in the ninth and tenth positions, where the answering jacks are ordinarily, as in Fig. 44. These toll lines are not multipled, but end in a single jack and drop, as shown in Fig. 45. This style of a jack cuts off on one side, which necessitates a drop of the tubular order to prevent cross talk between neighboring drops.

SEC. 5.		SEC. 4.	SEC. 3.	SEC. 2.	SEC. 1.
TEN TOLL DROPS	TEN TOLL DROPS	200 ANS. JACKS	200 ANS. JACKS	200 ANS. JACKS	200 ANS. JACKS

FIG. 44

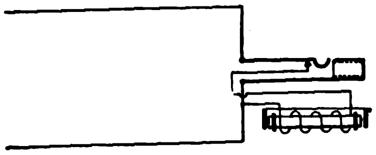

FIG. 45.—Toll line ending in single jack and drop

Fig. 46 shows a subscriber's line, with five multiple sections, and one answering jack, J^6, ending in tubular drop, TD. The entrance of the plug will raise the tip spring and disassociate the line drop from the line.

Fig. 47 shows the regular operator's cord circuit, where K^1 is the listening key, K^2 and K^3 the ringing keys, COD the clearing out drop and OPR the listening set.

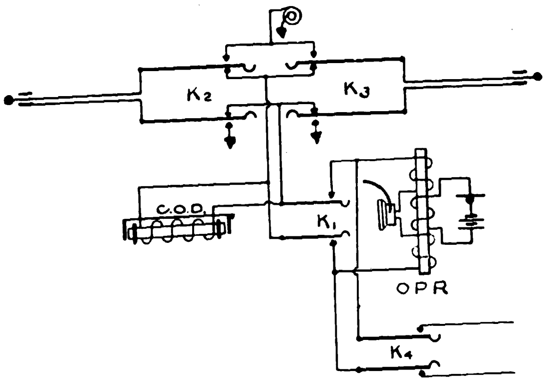

FIG. 47

Fig. 48 shows the same circuit for toll work, with the exception of the additional key, K^5, which controls the repeating coil, which may at times be necessary to preserve balance. One-half of the repeating coil has a condenser at its middle points to give the clearing out signal a decided impulse.

But so far no busy test is provided. If the operators were to test the jack of a line wanted by the usual method of touching the tip of the plug to the sleeve of the jack there would be no sound in the receiver. In the grounded system, battery existed between the ground and the operators' set, and the busy test depended upon grounding the multiple sleeves at the subscribers' station, which caused the tested subscriber to get the busy click. In the self-restoring system the operator depended upon the middle point of the receiver with the induction coil secondary grounded, and the busy test obtained by the plug sleeve potential being communicated to the sleeve of the jack.

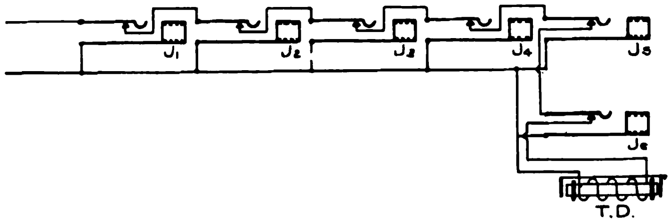

FIG. 46.—Subscriber's line, five multiple and one answering jack

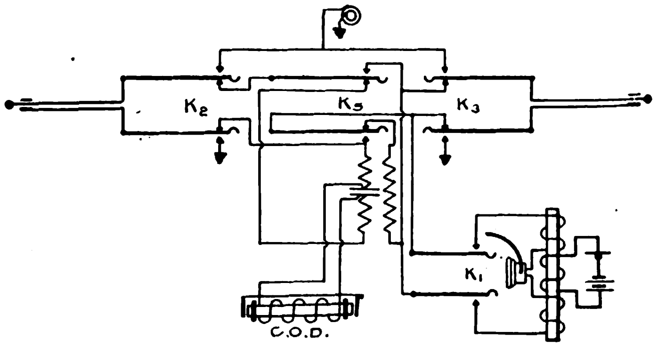

FIG. 48

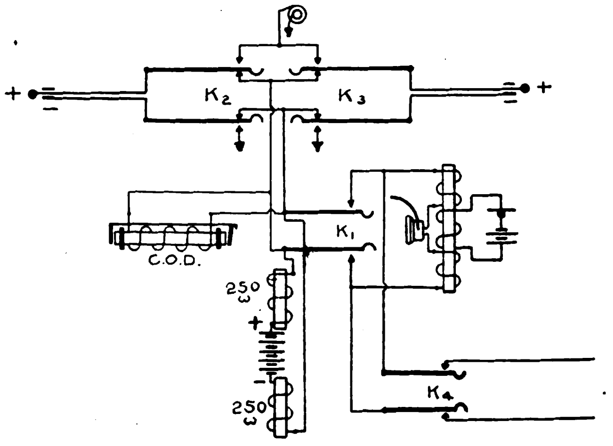

FIG. 49

But in the present system, how will the "busy" be accomplished? Some means must be employed which will cause the

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Editor's Note—The first article of this series appeared in the issue of November 29. They will continue for many months.

entrance of any plug to change the potential of that jack with respect to any other plug tip.

Fig. 49 shows the addition of two 250-ohm impedances, on each side of an eight-volt battery of Fuller cells and connected to the cord circuit in parallel with the listening key and clearing out drop. The positive side of the battery is connected to the tip of the cord circuit and the negative side to the sleeve, so the entrance of the plug causes a potential to exist on the jacks, according to Fig. 50.

As the tips of every plug have a plus potential with respect to the same battery, the entrance of any plug in any jack will put a plus potential on every tip spring of the multiple and a minus potential on the sleeve of the corresponding multiple jack. Now, according to Fig. 51, if the tip of a plug with the positive potential is touched to the sleeve of the jack with negative potential, a click is made in the receiver. Now this test is *not* given upon touching the tip to the sleeve of another jack, but when the tip is withdrawn. Tracing the path of the current, we find that it starts from negative and terminates at the sleeve of the jack. Touching the tip of another cord circuit gives the minus a chance to flow back to the plus through its 250-ohm impedance coil, which charges the impedance coil. Withdrawing the tip, the flow ceases, and this stored up magnetism sets up an electromotive force of its own. The receiver, being in closed circuit about the impedance coil, receives the current which makes itself known in a click.

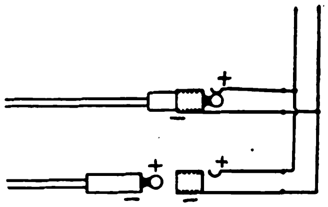


FIG. 50.

If no impedances were inserted, no busy test would be available, cross-talk would exist between circuits and each cord circuit would be short-circuited by the test battery.

If a toll line party calls for a city party, the toll operator tests the multiple jack, and if not busy, plugs in and rings the party directly. The question now arises how a local party can get the toll board.

If a city party calls for toll, the answering operator presses order key K^4, communicates directly with the toll operator and simply says: "No. 50." The toll operator immediately picks up a plug and directly inserts it in the multiple jack of No. 50 and takes care of the call. This act of calling the toll board is shown in Fig. 52, where the cord circuit shown on the upper side is the regular operator, who has just answered No. 50 and found that toll was wanted. She presses K^4 and speaks to the toll operator, shown underneath, who inserts her plug in the multiple of No. 50 while the originating operator withdraws her answering plug.

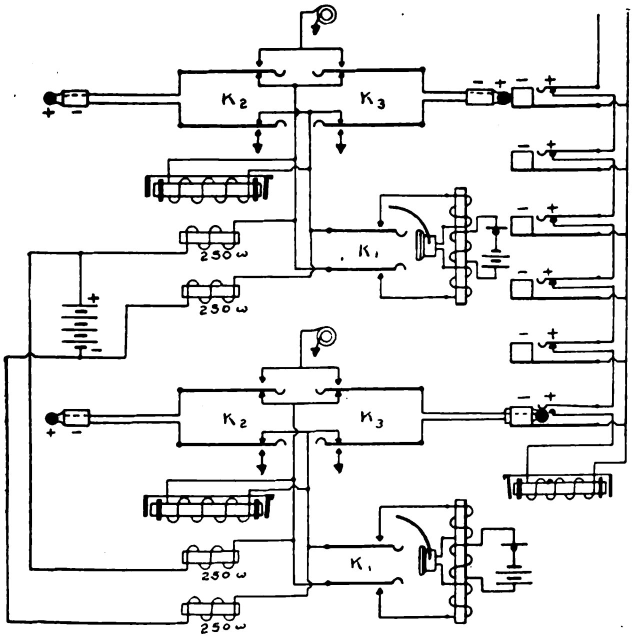


FIG. 51.

This method saves trunking and requires only a multiple set of order buttons, but the expense of the multiple jacks is objectionable. If there were several toll operators the order wires would end in the receiver of one operator, called the recording operator, who would make out toll tickets and pass them to the operator in charge of the line in question. As long as both toll and local operator are of like nature, the cord circuits are similar. When toll and local service differ, then the cord circuits are different and must be studied under separate heads.

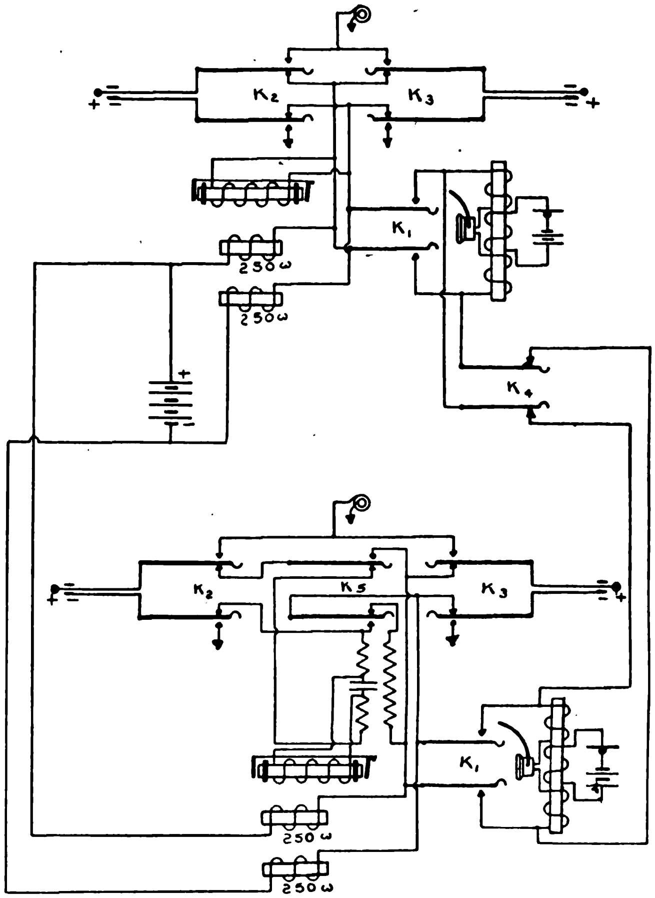


FIG. 52.

When toll boards are operated in connection with common battery boards the self-restoring drop system is used, the two-point plug being confined to isolated places.

CONVENTION OF KANSAS STATE ASSOCIATION.

TOPEKA, Kansas, has been fixed on as the meeting place for the next convention of the Kansas Independent Telephone Association. The association will meet at the Throop House on January 28 and 29. Strong interest will be manifested in this meeting, for one of the important tasks to be disposed of, is a plan for more toll and long distance lines. This subject is of more interest to Independent telephone operators in Kansas and surrounding States, than any other. It will be remembered that considerable discussion of toll line propositions was indulged in at the last meeting of this association at Kansas City, Mo. Steps were taken for connecting all important Independent systems in the vicinity, with the Home Telephone plant, which is building in Kansas City.

At the forthcoming meeting more definite plans will be prepared and adopted for the complete connection of all Independent exchanges in the States in the vicinity of Kansas, and especially for toll connections with Kansas City, Mo., which has so long been shut off from communication with towns supplied by Independent service.

The officers of the Kansas Association are as follows: A. R. Champlin, Newton, president; B. F. Pankey, Topeka, vice-president; C. E. Wells, Marion, secretary; J. W. Smith, Minneapolis, treasurer.

CONVENTION OF NORTHWESTERN CEDARMEN

FIFTY representatives of the cedar pole industry in the Northwest met in convention at Minneapolis on January 12th. They were the delegates to the Northwestern Cedarmen's Association, and this was the seventh annual meeting of the Association. The convention was held in the West Hotel in the ladies' ordinary.

President Worcester called the meeting to order at a quarter to three o'clock in the afternoon. Secretary F. H. Gilman read his report. In part it was as follows:

"It is appropriate at this time to briefly review the cedar trade situation as it has been during the past year. A year ago at our meeting at Menominee, our president in closing his annual address, said that he hoped our members would experience during the year 1902 a season as prosperous as during 1901. You who are present here, know how much his hopes have been realized. There are probably some of you who feel that you have not realized your expectations during the past twelve months. For some unexplainable reason, poles were not in as good demand last year as the prosperous condition of general business would warrant. The large consumers of poles, among the telephone, telegraph and electrical companies seemed to curtail operation in a way to cut off the demand for poles.

"The following have joined our association at and since our last annual meeting: I. Stephenson Company, Wells, Mich.; E. E. Naugle Tie Company, Chicago, Ill.; Chicago Lumber & Coal Company, Minneapolis, Minn.; Francis Biedler & Company, Chicago, Ill.; T. M. Partridge Lumber Company, Minneapolis, Minn.; Scott & Taylor, Ashland, Wis.; Kellogg Switchboard & Supply Company, Escanaba, Mich.; Wisconsin Timber & Land Company, Mattoon, Wis.; Cloquet Tie and Post Company, Cloquet, Minn.; Samuel C. Jackson Company, Tenstrike, Minn.; A. E. Whitmore, Minneapolis, Minn.; Fowler-Jacobs Company, Chicago, Ill.; Hall L. Brooks, Tomahawk, Wis.; D. A. Haneman, Earlville, Ill.; Hughes-Mackintosh Company, Minneapolis, Minn.

"With efficient work on the part of your secretary, I believe that it will not be in the far distant future when our membership roll will number the names of one hundred representative handlers of white cedar products.

"I believe this marks a point in the history of our association where it is to become more of a business organiaztion. Its influence is now very large and it is recognized by the trade generally, and its specifications, official weights, etc., have a standing throughout the country. The railway weighing associations are more and more depending upon our official weights in the settlement of claims. This is an important point gained."

Treasurer H. W. Reade then presented his statement of the financial condition of the association as follows:

January 7, 1902, balance on hand	$580.42
Received from interest, fees and dues	905.00
Received from selling classification books and lists	17.55
Total	$1,502.97
Disbursements	1,424.71
Balance on hand January 12, 1903	$78.26

The report was approved by the Association and ordered placed on file.

Secretary Gilman then announced that a smoker for members would be given in the evening at the Minneapolis Commercial Club rooms.

President Worcester then called for the committee reports.

R. H. Downing, chairman of the railroad committee, said his committee had taken up the matter of getting a reduction of the minimum car load rates, but they had not been able to make a strong enough case to bring success. They had found that many who made complaints of overweights, had been able to get rebates from the railroads if they proved their cases.

William Mueller, Jr., chairman of the official inspection committee reported that his committee had been called on five times during the year to settle disputes and had been able to satisfy both disputants.

G. L. Lindsley, chairman of the pole committee, reported for his committee that it had been unable to agree on any list price to present to the association. This brought out a discussion of the pole question and President Worcester surrendered the chair temporarily to R. H. Downing while he talked on the subject. After considerable discussion it was decided to accept the report of the pole committee.

President Worcester then announced a nominating committee as follows: H. S. Gilkey, F. J. Lang and G. L. Lindsley, and the association took a short recess while this committee prepared its report.

Chairman Gilkey of the committee announced the following nominees for officers for the ensuing year, when the convention was again called to order: For president, R. H. Downing, Minneapolis; for vice-president, William Mueller, Jr., Chicago. Directors: C. H. Worcester, G. L. Lindsley, George Nicholson, Jr., and H. S. Gilkey.

On motion, the secretary was instructed to cast the unanimous vote of the association for these nominees and they were declared elected.

As there was no further business before the convention, it was moved, seconded and carried to adjourn the convention.

Following the adjournment, the board of directors held a meeting and re-elected secretary F. H. Gilman and treasurer H. W. Reade.

President Downing appointed the following standing committees:

Poles: Chairman, C. H. Worcester,, Marinette, Wis.; M. H. Coolidge, Minneapolis, Minn.; J. C. Kirkpatrick, Escanaba, Mich.; Wm. Mueller, Jr., Chicago, Ill.; E. H. Valentine, Chicago, Ill

Official Inspection: Chairman, Wm. Mueller, Jr., Chicago, Ill.; Hall L. Brooks, Tomahawk, Wis.; J. K. Wright, Marinette, Wis.; H. W. Reade, Escanaba, Mich.

Railroads: Chairman, E. E. Naugle, Chicago, Ill.; J. C. Kirkpatrick, Escanaba, Mich.; W. T. Watkins, Minneapolis, Minn.

A delightful smoker and specialty entertainment was given the delegates at the Minneapolis Commercial Club in the evening, at which all had a good time and came into closer personal touch.

CONTEMPORARY CROSS TALK

By "The Listening Key."

WE have considered the offset that the traffic itself contains to the effect of the increased range of the average local message. One of our recent discussions closed with these words, "It would therefore appear that as the whole tendency of the telephone service is for it to become better, cheaper and more widely developed, and thus to favor the increase of short messages, the traffic contains within itself an automatic offset to the increased distance over which the average local message will have to be carried." We might amend that summing up by saying "the traffic of a well-managed system." Practically the whole question of success in a telephone enterprise depends upon the management, and there is probably no other business where the "personal equation" plays so important a part. To a certain extent the success or failure of any business depends upon the management; but we see some businesses make money in spite of bad management and we see others fail because of adverse conditions that no sort of management can overcome. In many cases the public demand and the lack of competition create such conditions that a business is successful from a money-making point of view even under a most obviously inferior management.

In others a change in the public taste, the appearance of new processes and methods and of aggressive competition will undermine the trade of an old-established concern to an extent that will put it beyond the power of the best possible management to avert failure.

* * *

In telephone work the problems are so many and so varied, and from the nature of the service the human element enters so largely into the general problem, that the question of management is an all-important one. A clever and resourceful manager will be able to conduct a profitable business at rates materially lower than those which would fail to pay a profit under inexperienced or unprogressive management. There is no greater mistake than to imagine that the telephone business will run itself, or that it is a gold mine with the precious metal lying so readily available that the most untrained hands may easily gather it in. That many have thought so in the past the history of Independent telephony clearly shows. That not a few have begun to see their errors recent events and discussions have generally revealed. The most difficult point that a telephone manager has to deal with is the question of rates, and in the establishment of a new concern he is faced by the awkward difficulty of having to fix his rates long before he can have any accurate knowledge of what the cost of production will be. Rates and prices are generally, but by no means always determined more or less by the cost of production. This is less true of services than it is of actual commodities, but whatever the various modifying influences may be, one thing at least is certain. And that is, that if the cost of production is sensibly higher than the selling price, a losing business must result.

* * *

Many people seem to have thought that the telephone business was immune from this natural law, and have been guided by ignorant or intentionally misleading estimates of cost of construction and operation to adopt rates that have quickly proved to be unremunerative in actual practice. It is clear that the telephone manager is in a most difficult position in having to fix rates for his service before he has any practical experience of what the service will cost him to supply, but he undoubtedly increases the difficulties if he refuses to be guided by the experience of others and listens solely to the interested advice of those who have little care as to what the future of the concern may be. Contractors and manufacturers are eminently qualified to estimate the cost of the plant called for by a given specification and are qualified to a certain extent to estimate the cost of its yearly maintenance, but their estimates as to what the total cost of operation will be and what the various rates for service should be are by no means always safe guides on which to draw up a schedule of rates. The telephone business can be run economically, much more economically than it often is run, but it must not be run parsimoniously. To operate a successful and enduring business, depreciation and reconstruction must be properly looked after, and good wages must be paid to secure high efficiency in all departments of the concern. If the plant is starved and if the staff is underpaid, the efficiency of the service is soon undermined. Indeed a service run on these lines never even reaches a point where it can properly be called efficient.

* * *

The telephone manager confronted with the problem of fixing rates in advance has two important points to consider. There are really more than two important points, quite a good many more when we come to go into the subject in detail, but there are two points in considering the question broadly that are most important. One is that the various items that go to make up the cost of producing the service must be estimated liberally, especially those of maintenance, depreciation and reconstruction, and due allowance must be made for them in calculating the rates; the other is that it is much easier to come down than to go up. The manager who estimates everything at the lowest possible figures, ignores depreciation and contingencies, possibly omits any allowance for very necessary working departments and then puts out a very low flat rate, inviting his customers to "talk as much as they like" is flying in the face of all previous experience, and is piling up trouble for himself that will inevitably become manifest before very long. It is by no means easy to raise a rate that has once been fixed, no matter how plainly evident it may be that the rate is unprofitable. The public objects for one thing, and when the public objects the public can become very objectionable. Likewise the newspapers. And despite the ignorance and prejudice displayed by many newspapers they still have considerable power and influence, since so many people form their opinions solely on the strength of what they read in the newspapers.

* * *

On the other hand, a manager who starts in with a broad scheme of providing the best possible quality of service and of attaining the utmost possible development, who makes due allowance for all the numerous items of working expenses, who recognizes that quantity as well as quality of service costs money and makes out a scale of rates that shall safeguard these various points, is in a very different position. If some of his rates do not succeed he can adopt others for other grades and quantities of service. He very possibly may not be able to foretell accurately all the different arrangements that will best suit his system and his subscribers. But with an elastic scheme of rates he will be able to make changes and modifications as practical experience may suggest. At least he will not have tied his hands behind his back by adopting, before the business is started, a low flat rate that the development of the system and the growth of the traffic will speedily overtake and render unprofitable.

* * *

The question of rates is the most important and the most difficult matter which the telephone manager is called upon to decide. Yet how often have we not seen it decided in an offhand, haphazard manner with very insufficient information as to the cost of the service and with practically no scientific investigation of what the total costs are likely to be, what the variable elements are, what causes are likely to influence those variable elements and what general effect on the cost may result as the system develops and the traffic grows. For the sake of the future of the business as a whole very much more serious study will have to be given to the subject of rates than has been devoted to it in the past. Bismarck once said that a fool learns by his own experience but a wise man profits by the experience of others. There is now a fairly large and accumulated fund of experience as to the working of the various schemes of telephone rates that have been tried and it seems a trifle worse than foolish for new telephone concerns to start business with plans that wilfully ignore all the teachings of that experience.

* * *

If there is one thing that experience has shown everywhere it is that flat rates in large systems do not pay; or at least, if that is too narrow a statement, since a relatively small system at a high flat rate obviously does pay, that flat rates for large systems are fundamentally incorrect for the reason that if high they prevent development and if low they sooner or later become unprofitable. If that point has not been conclusively demonstrated these notes have been written in vain, but presumably there are still many telephone managers who are unconvinced and who will be satisfied with no other teacher than their own dearly-bought experience. Our ideal telephone manager, however, is no such stubborn individual. He, having ranged over all the various schemes of telephone rates in force, elaborates his schedule in accordance with the quality of service he intends to provide and with the various kinds and amounts of service that will suit the varied telephonic wants of the public, also having in view that the ultimate development of the system is intended to carry the service into every office and house in the town. Then he proceeds to secure his subscribers and establish his system in serene confidence that he is working on a correct financial basis.

NORTHWEST KANSAS ASSOCIATION

THE semi-annual convention of the Northwestern Kansas Telephone Association was held in Clay Center, Kas., recently in the parlor of the Bonham Hotel. About twenty-five members were present, including the officers—President, W. R. Nelson, of Smith Center; secretary, Dr. Tyler, of Clifton; treasurer, Mr. Dilworth, of Beloit.

The principal matter of business discussed was the building of a trunk line into Kansas City to be run by the Independent owners of this section of the state. J. E. Zeluff, of Toledo, Ohio, made the proposition to the association. His plan is to build a trunk line out of Kansas City as far west as the business will warrant, the Independent owners supporting it by paying toll. The proposition was very favorably received by the association.

Mr. Zeluff says he has sufficient backing to make a success of the Independent line. Practically all exchanges in this section of Kansas are owned by Independent people. Should they get a direct line into Kansas City it would greatly benefit their trade.

THE ROCK TELEPHONE COMPANY

THE Rock Telephone Company is giving the people of Rush, Pawnee and Barton counties, Kansas, a service that for promptness and efficiency, cannot be excelled. The company has connections with all points of any commercial importance in these three counties and will doubtless extend its lines into other counties early in the spring. The operating switchboard is located at Albert, in Barton county, where, besides the various toll lines, the company maintains a small number of subscribers' instruments. The grounded series system is used for all lines, in connection with the latest improved talking sets. The company now owns and operates lines connecting twelve different towns as follows: Albert, Heizer, Rush Center, Pawnee Rock, LaCrosse, Timkin, Shaffer, Great Bend, Dundee, Bison, Ray and Larned. Besides these about fifty other towns are reached over other companies' lines. The rates charged are very reasonable and as a result the company has a good patronage. With the employment of courteous operators and careful management at all points, a bright outlook is predicted for the future of this young institution, which has only been in operation about one year. The Rock Telephone Company is incorporated with a good-sized capital stock. Its officers at present are: C. E. Clutter, president, Pawnee Rock, and E. S. Lindas, of Larned, secretary, who are doing everything in their power to advance the Independent telephone interests of this section of the country.

INDEPENDENTS WANT CONNECTION WITH SIOUX CITY, IOWA

THE construction of a new copper metallic circuit telephone line between Sioux City, Ia., and Chicago, without local interruptions, is promised in the event that Sioux City extends a franchise to the Independent lines which seek to enter the town.

The latest project includes also a line between Sioux City and Omaha, without local connections.

The line eastward as planned would be a direct one. It would follow a course which would reach the following towns, but not be tapped by the towns: Onawa, Denison, Carroll, Jefferson, Boone, Nevada, Des Moines, Marshalltown, Toledo, Vinton, Cedar Rapids, Marion, Anamosa, Maquoketa, Rock Island, Moline, Davenport, Clinton, Fulton, Morrison, Sterling, Dixon, Rochelle, De Kalb, Cortland, Geneva and Chicago.

On the same poles there would be placed Independent circuits reaching across Iowa to Davenport or Clinton, and perhaps direct lines to other points, without intermediate tappings.

The building of this enterprise is not in the hands of the companies which seek to enter Sioux City, other capitalists having this matter in charge, but stockholders in the Independent companies declare they will become interested and help to build the big line in the event they get into Sioux City.

The promoters of the Independent exchange project say there are over 7,000 telephones in northwestern Iowa alone not including those in Nebraska and South Dakota, that now have no connection with Sioux City, but which will be connected with Sioux City if the Independent lines build an exchange there.

The following list has been made of the Independent telephones, both town and rural, in northwest Iowa, which would be connected with Sioux City through an Independent exchange.

Fonda—120 town and 20 rural.
Storm Lake—200 town and 30 rural.
Aurella—56 town.
Rockwell—148 town and 45 rural.
Fort Dodge—930 town and 21 rural.
Manson—108 town and 41 rural.
Lake City—169 town and 48 rural.
Lohrville—59 town and 13 rural.
Sioux Rapids—98 town and 5 rural.
Sac City—160 town and 40 rural.
Early—62 town and 79 rural.
Schaller—69 town and 38 rural.
Galva—67 town and 77 rural.
Cushing—26 towns and 77 rural.
Correctionville—88 town and 26 rural.
Kingsley—68 town and 57 rural.
Moville—47 town and 60 rural.
Cherokee—212 town and 76 rural.
Washta—20 town.
Holstein—133 town and 138 rural.
Ida Grove—254 town and 174 rural.
Battle Creek—95 town and 126 rural.
Danbury—35 town and 35 rural.
Mapleton—95 town and 35 rural.
Pierson—40 town.
Ute—30 town.
Castana—40 town and 40 rural.
Turin—20 rural.
Onawa—190 city and 10 rural.
Woodbine—157 town and 51 rural.
Missouri Valley—215 town and 155 rural.
Dunlap—98 town and 27 rural.
Logan—175 town and 85 rural.
Odebolt—115 town and 90 rural.
Schleswig—30 town and 40 rural.
Denison—150 town and 150 rural.
Vail—25 town and 40 rural.
Oto—30 town.
Peiro—15 rural.
Climbing Hill—15 rural.
Holly Springs—15 rural.
Hornick—15 rural.
Carroll—275 town and 90 rural.
Auburn—25 town.

W. H. Leathers, of Mapleton, president of the Maple Valley Telephone Company; Fred Marquis, of Onawa, secretary of the Monona Telephone Company, and C. H. Smith, of Odebolt, secretary and manager of the New State Telephone and Telegraph Company, who is also secretary of the Maple Valley Company and a director of the Crawford County Telephone Company, all of whom are in Sioux City in the interest of the proposed exchange, feel confident the people of Sioux City will welcome them.

"Our companies have contracts now," said Mr. Smith, "for entering into traffic arrangements with Independent lines extending over the entire northwest portion of the state, and assurances which will permit connection with every part of the state. The Independent toll lines in Iowa are far more extensive than the lines of the Bell people. The last tax report gives the value of Independent lines in the state as $2,384,229.40, while the value of the Bell company's lines is $1,035,000."

DES MOINES MUTUAL COMPANY

AT the annual meeting of the stockholders of the Mutual Telephone Company, of Des Moines, Ia., it was shown the six toll line companies, which have become heavily interested in the Mutual, have acquired $24,670 of the $30,000 of preferred stock. The effect of the ownership of this stock was to give the toll lines practical control of the Mutual.

The toll line companies which have operated to take over the Mutual as giving them excellent terminal facilities in Des Moines, are, the Martin company, of Hamilton county; the Boone, of Boone county; the Bellamy, of Marion county; the Southern, of Mt. Ayr; the Jasper county and the Hawkeye companies. Connecting with these companies are scores of farmers' telephone systems which operate through the local exchanges of the Independent companies, embracing several thousands of miles of lines which connect with the residences of farmers in a dozen counties of the state.

Control of the Mutual will give the toll line companies connection with the nearly 3,000 subscribers in Des Moines. Wishing to maintain harmonious relations with the stockholders and subscribers of the Mutual, the toll line companies, though in absolute control by reason of having acquired a majority of the preferred stock allowed the minority to elect five members of the new board of directors as against four elected by the new owners. The new board will be composed of the following directors: Clyde E. Brenton, of Dallas Center; E. H. Martin, of Webster City; J. S. Bellamy, of Knoxville; E. O. Montgomery, of Boone; representing the toll lines, and J. W. Hill, J. C. Hume, M. McFarlin, F. C. Hubbell and L. M. Grimes, formerly members of the board of directors of the Mutual company.

It was stated at the meeting that the annual rentals derived from subscribers would amount to about $60,000, while the expenditures would represent an outlay of $50,000. The value of the plant as it stands at this time is estimated to be $84,000, though others expressed a decided opinion that its actual value was nearer $125,000 than the amount named.

The mutual character of the company, as understood at the time of its organization, has largely ceased to exist, though several hundred of the business men of the city still retain stock in it.

Manager Geo. W. Bandy has since last June, when he came to the management, expended $33,000 for material and improvements.

The total indebtedness of the Mutual is $51,460.77. In addition to this the company owes the city $12,000 on its franchise tax, the ordinance giving it a franchise providing it should pay into the city treasury 5 per cent. of its gross earnings.

HARD BLOW FOR BELL

THE Sullivan, Indiana, City Council at a recent meeting, rescinded the perpetual franchise it granted to the Bell Telephone Company in 1896. The Bell Company started to install a system, but the citizens filled up the post holes as fast as they were dug. The Independent Company in Sullivan has 500 telephones in operation and is preparing to purchase material to put in a new switchboard and 100 miles of country line.

The Sullivan Company will soon absorb a new private company that is being built at Merom, six miles west of Sullivan. It has just finished a new connecting line with the Robinson Independent Company, across the Wabash in Illinois.

PENNSYLVANIA COMPANY REORGANIZED

BY an amicable agreement between the stockholders of the West Penn Telephone Company the affairs of the concern have been placed in the hands of President J. W. Nesbit, as receiver, says *Money*. This action was taken to straighten out the affairs of the company, which are in a rather tangled condition. A syndicate will be formed for the purpose of buying in the property and placing it on a very much better basis. This action is the result of some dissension among the stockholders that has been on for some time.

The proposition was made by certain men for the purchase of a controlling interest, the construction of a system from Pittsburg to Wheeling and the reconstruction of the lines in Washington, Pa., and other places. This proposition was taken up at a meeting held in Washington, Pa., but which met objection on the part of the country stockholders. The Pittsburg men made a proposition that the company be divided, which was favorably received. Last week a suit was brought in the Washington county courts to force the company into the hands of a receiver, and it was agreed that Mr. Nesbit, who besides being president of the company, is pension agent at Pittsburg, would be acceptable to both factions. The plantiffs in the bill filed are: W. E. Stevenson, Margaret Stevenson, H. L. Snodgrass, W. T. McGill, J. S. Hunter, C. M. Hunter, W. F. Carothers and C. R. Conger, who are stockholders, and Homer Cromrine. Most of these are securities on a note held by the First National Bank of Claysville for $4,000, which became due on January 3. The company is said to be solvent, and the appointing of a receiver will have the effect of ultimately placing it on a very much better basis. The company secured its charter in Pennsylvania in 1898. The original capital was $12,000, which was subsequently increased to $50,000. Of this amount $12,725 has been issued. The company has constructed lines in Washington county and has a line extending from McDonald to Carnegie, connecting at Carnegie with the Pittsburg & Allegheny Telephone Company. It also has a line extending across the State of West Virginia, connecting with the towns of Bethany and Wellsburg, W. Va., and Steubenville, O. Its liabilities are said to be about $20,000, exclusive of the capital stock. The petitioners claim that the business of the company has been mismanaged, and that its business has for some time past been falling off, the plant operating at a loss. It is also claimed that the company is in arrears for wages due, and that repair work necessary for the preservation of its lines has been discontinued. Portions of the indebtedness are said to be overdue and that the remainder will soon mature. The officers of the company are: President, J. W. Nesbitt; secretary and treasurer, W. L. Scott; general manager, T. B. Lee. The directors are J. W. Nesbit, T. B. Lee, David Campbell, Richard Gladden, J. B. Painter, J. P. Linn, C. C. Scott and J. B. Perrin.

FARMERS' COMPANY WINS

THE authorities of Grass Lake, Michigan, and the Farmers' Telephone Company, who have some time been at variance and giving each other galvanic shocks and "short circuits," are at peace again, says the Detroit *Tribune*. The Grass Lake people supposed they had rights over their own streets, and they removed the poles of the company; but legal advice was adverse to this assumption and Grass Lake having found that the company may stick their poles where they darn please, will replace those removed from the highway. And now "Hay Rube's" old hat is well over one ear and he reefs up his trousers and says "B'gosh we showed em!"

INDEPENDENT COMPANY IN CHARLOTTESVILLE, VA.

THE Albemarle Telephone Company is now operating in Charlottsville, Va. It is the only line operating in that city since the Bell Company lost its franchise, about a year ago. The latter company has not been able to regain a franchise, though repeated endeavors have been made. At a recent meeting of the company, for the election of officers, the president, vice-president, secretary and superintendent were re-elected. J. Frank Kelley is the efficient superintendent of the company.

The reports for the year showed that the company has seven hundred subscribers, an increase of seventy-five over the number of the preceding year.

The following are the rates: For business houses, $28 a year; for residences, $15, and for party lines in the country, $20 per year. The line is in good financial condition.

The company has just completed a line to Simeon, via Montecello. This line is the best constructed of the many lines belonging to the company and is built in an up-to-date style with the use of the best material. It will shortly be extended from Simeon to Carter's Bridge and from Simeon to Wilhort's Store.

This entire work has been and will be under the superivision of Mr. Kelley, who states that the company is kept busy constantly installing new subscribers both in the city and county.

OPINION AND COMMENT

A GREAT VICTORY FOR THE INDEPENDENTS

MOST practical telephone men who have given the subject thought, must have discounted the decision handed down, last week, by the United States District Court of Appeals in the Berliner case. In consequence the importance of this decision may not be generally appreciated. As a matter of fact, so far as the development of Independent telephony is concerned, few things more advantageous could have happened. As soon as the full purport of this decision becomes generally known, one of the difficulties that now beset the Independents ought to disappear, for a thorough understanding of the decision will clarify the financial atmosphere in the East. Heretofore, the Bell people have always been able to influence capital in the money centers by parading the bug-a-boo of the Berliner patent. Every man, it was quietly given out, who invested in Independent properties was investing in an infringement such as the controlling basis of telephony was involved in the Berliner suits and a decision sustaining the Berliner patent would wipe out of existence every telephone company operating without a license from the Bell. This sort of talk has been much more effective in withholding financial support than the men out in the field can appreciate. Its effect has been to block progress in many hopeful enterprises. The Bell fully realized this, and for years it has worked the Berliner patent scare for all it was worth. In every technical journal that would accept the matter, the company carried a warning notice, the only object of which was to influence, adversely, men who might contemplate investing money in the Independent field.

Inspired interviews were constantly circulated from the Boston headquarters, setting forth the alleged importance of the Berliner device and pointing out that an ultimate decision, upholding the Berliner claims, meant that the telephone situation would be resolved once more into the condition where it was during the life of the Bell, Edison and other patents; in other words, that the Bell would once more have a monopoly and every Independent concern be driven out of business. On their face these statements were most plausible and the average layman, especially the average capitalist, who is naturally a most timid being, accepted them as gospel.

Every Independent telephone man who brought a proposition, no matter how enticing, to Wall street, or the other money centers, was at once confronted with the Berliner scare and no amount of argument sufficed to disabuse the impression that the Independents were rank outsiders, who must, sooner or later, come to grief in the courts. That was the chief value of the Berliner litigation, instituted by the Bell people. They knew very well that even if their claims were sustained, it would in no wise affect the position of the Independents because the Berliner patent protected nothing that the Independent manufacturer cared to produce.

This fact has not been officially made clear by the Boston decision. In the home of its best friends the Bell is confronted with the court's opinion setting forth that Mr. Berliner never invented anything that had commercial value or that could have commercial value. It covered simply metallic contacts, the court finds, and metallic contacts are not, and never have been, used in commercial telephony. That disposes of the whole question at issue and it is absolutely certain that the last has been heard of the Berliner litigation.

All that remains now to the Bell people is the ghost and this the Boston Company, with its usual ingenuity, is working as best it may. Through its inspired organs, of which it has a great many, it is sending out news of the decision under such headlines as "The Court of Appeals declares Berliner patent valid." In *The Boston News Bureau*, which is one of the chief sources through which the Bell people disseminate their inspired literature, the following appears under the date of January 16th:

"Boston—In the case of the American Bell Telephone Co. vs. the National Telephone Mfg. Co., et al., the United States District Court of Appeals sustains the validity of the Berliner patent.

"The court holds, however, that there is no infringement on the part of the defendant, and affirms the decision of Judge Brown of the Circuit Court, solely on this ground.

"Judge Brown had held that the patent was invalid.

"The decision of the U. S. District Court of Appeals in the Berliner patent case to-day is a victory for the American Telephone Co. in that it declares valid the Berliner patent."

Mr. Charles C. Bulkley, counsel for the Independent manufacturers whose knowledge of telephone patent law is probably as great as that of any man in the country, in an article on the first page of the current issue of THE AMERICAN TELEPHONE JOURNAL makes clear just what the Boston decision means and how little justification there is for the publication of such articles as that quoted above. All that is necessary now is that the Independents set the true facts before the newspapers in their communities. This course persevered in, will soon convince even the most obdurate, that the Berliner patent so far as it could possibly affect an Independent telephone company is as useless as a patent covering a new air-ship.

AN IMPORTANT COMPETITIVE CENTER

EVANSVILLE, Ind., and the territory immediately surrounding that city is now the centre of competitive telephony in that section of the country. Evansville has as yet no Independent telephone plant. It is the one stronghold of the Bell monopoly in this part of Indiana. Many efforts have been made by Independents to get a foothold in Evansville, all of which have so far failed. Evansville is the gateway to the South that every Independent company in Northern Indiana and Illinois will have to enter. That is why there is such a keen fight for entrance there. The Cumberland Telephone and Telegraph Company, the Bell licensee in Evansville, also realizes how important Evansville is as a telephone centre.

So disgusted are the people of Evansville with the service of the Cumberland and all its promises to do better that they have raised funds and are now preparing to construct a municipal telephone plant. This system will be "municipal" in name only. All of the stock has been subscribed by either the citizens of the town or private individuals. Several of the Independent companies that want entry to Evansville have also taken large blocks of stock. Over $100,000 has been subscribed for this work, and the contract for construction will be given to a construction company in a short time.

The Independent companies outside of Evansville are particularly active just at present building toll lines everywhere. They have thoroughly covered every nook and corner in that section of the State. The Cumberland is endeavoring to duplicate all their lines, and wherever it has competition offers a ruinously low rate. The people are sticking to the Independent, however, and the Cumberland's efforts are not meeting with encouraging results.

A strong point for the Independents is the fact that they now have connection with the splendid system and toll line service of the new Louisville Home Telephone Company.

The people of Southern Illinois and especially in Gallatin County, are deeply interested in securing connections with Evansville. If an Independent system is established there the entire business of this prosperous section of the State will be diverted to Evansville.

So successful have the small mutual and Independent companies in Gallatin and surrounding counties been that they have practically driven the Cumberland to the wall. From complete control of the telephone service of this section, which three or four years ago it enjoyed, the Cumberland has been ousted until now its only possession in this territory is a small toll station at New Haven.

These Independent companies are nearly all organized on the mutual or co-operative plans. They are in the business to secure adequate telephone service; not to make money. Dividends are never declared. The cost to each subscriber amounts to about 78 cents a year. Each subscriber is a stockholder, and with but few exceptions each stockholder owns but one share. None but a philanthropist would wish to hold more. A share of stock costs $25. Out of this amount a first class long distance telephone of the latest type is purchased and connected with the main line. The balance is turned into the treasury. At the end of the year the cost of maintenance and operation is figured. All expenses are met, after which the balance on hand is divided pro rata among the stockholders. This service in the small farming villages and towns in this section of the country is extremely popular and the companies cannot meet the demand for telephones.

Patents

William M. Davis, of Chicago, Ill., patents (No. 715,999) and assigns to the Stromberg-Carlson Telephone Manufacturing Company a telephone system. This invention relates to an improvement in sub-station induction coils and is illustrated in Figs, 1, 2 and 3. The novelty consists in including the winding of the receiver in that of the induction coil. The invention is most readily comprehended by comparing it to a transformer. When the secondary winding is on an open circuit, the primary winding takes very little energy from the line. As the resistance of the secondary decreases by the addition of load, the primary automatically adjusts itself, supplying more power. This regulation is attributable to the mutual reactions of the two coils upon each other. With a sub-station induction coil, a similar condition prevails, of which Mr. Davis avails himself in this patent. The secondary circuit is made of low resistance; the ratio of transformation is four to five, both windings being about 11 ohms. The best receiver resistance is 25 ohms, secured by using two 50-ohm windings in parallel.

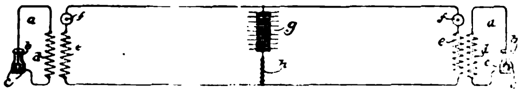


FIG. 1.

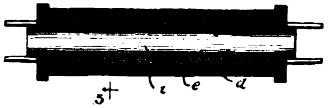


FIG. 2.

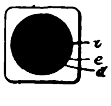


FIG. 3.

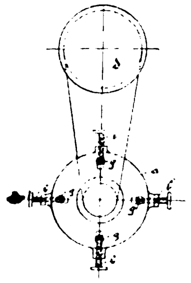


FIG. 4.

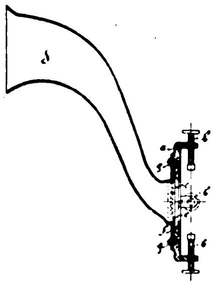


FIG. 5.

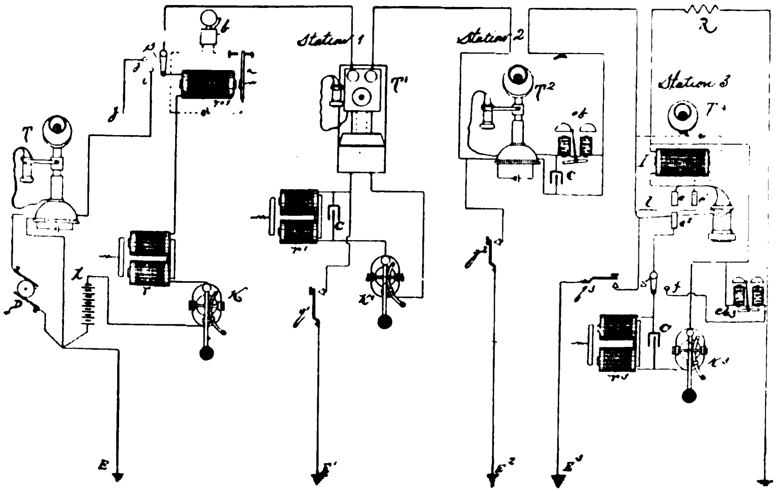


FIG. 6.

Arthur Schoeler, of Elberfeld, Germany, patents (No. 715,878) a swiveling trumpet for telephones. The invention is illustrated in Figs. 4 and 5 and relates to the mouthpiece for a transmitter. It exhibits the German impression of what such a device should consist. The features patented relate chiefly to the method of securing the mouthpiece in any position.

Charles E. Buell, of Camden, N. J., patents (No. 716,186) a combined telephone and telegraph system. This is a circuit intended to enable small stations to telegraph or telephone to each other at pleasure, but not simultaneously. Fig. 6 shows the principal features and is self-explanatory. The patent, however, does not describe any busy signal, which seems to be a radical defect.

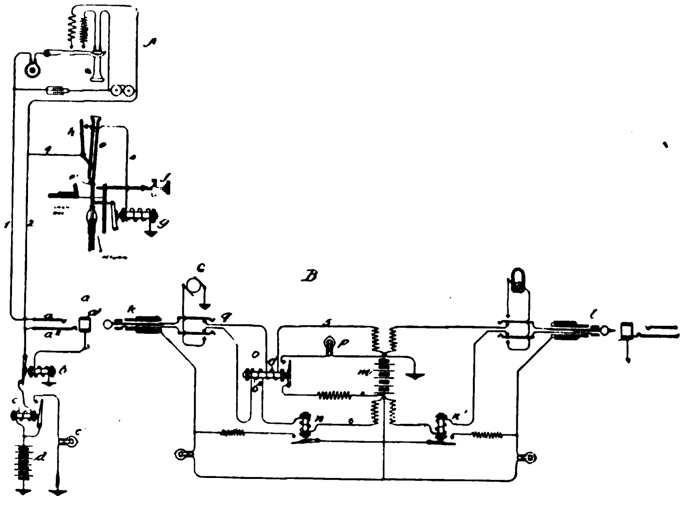


FIG. 7.

Charles E. Scribner, of Chicago, Ill., patents (No. 716,293) and assigns to the Western Electric Company a supervisory signal for telephone exchange systems, or "Chicago Coin Box Circuit." The device is illustrated in Fig. 7. The cord circuit is provided with a special lamp, *P*, and also with a key, whereby a current of relatively high potential, such as an Edison 110-volt circuit, can be connected to the line. At the subscriber's sub-station a coinway, *E*, is provided, into which the calling subscriber deposits the necessary fee. So long as the coin rests upon the ledge, *E*¹, the lamp, *P*, is excited, and the operator is advised of the presence of the coin in its proper place. In case the desired party cannot be obtained, the operator may notify the calling subscriber to press the button, whereby the coin is returned to the subscriber; or, if

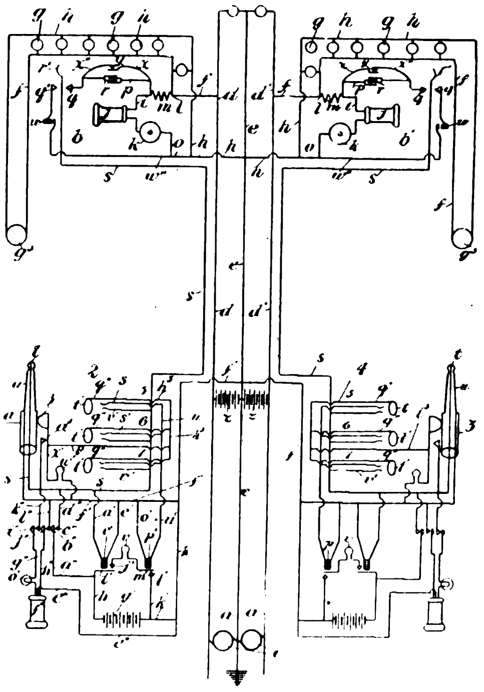


FIG. 8.

the connection is completed, the operator, by means of the key, *G*, can readily operate E^1 and deliver the coin into the proper receptacle in the coin box. Thus it appears that the lamp, *P*, informs the operator of the position of the coin; and the operator can control the delivery of the coin, either to the subscriber or the telephone company at pleasure.

Alexander M. Stark, of Toronto, Canada, patents (No. 716,302)

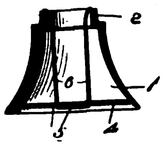


FIG. 9.

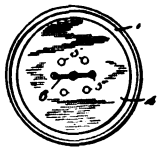


FIG. 10.

a combined telephone, telegraph, electric light and power system. The device is a circuit, whereby the inventor proposes to supply high potential currents for lighting and power and to telegraph and telephone to all subscribers connected thereto. The invention is illustrated in Fig. 8. The inventor proposes to use the

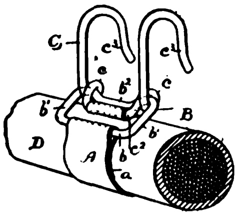


FIG. 11.

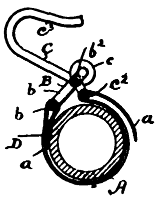


FIG. 12.

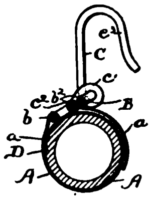


FIG. 13.

storage battery, *z z*, to render the line sufficiently quiet to permit conversation. It is, however, well known that such a battery will not relieve the noise due to commutator sing, and consequently the device is of very little value. The general principles are easily understood by tracing the circuits.

R. I. Willmarth, of San Francisco, Cal., patents (No. 716,329) and assigns to Adam Bergman an antiseptic protector for telephone mouthpieces. Figs 9 and 10 illustrate the device. The inventor provides a circular disc of paper to which a wire is attached, whereby the disc may be secured in the mouthpiece of the transmitter by slipping the ends of the bent wire into the slots cut in the mouthpiece.

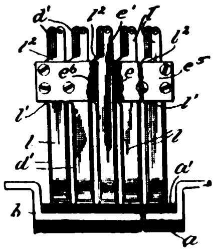


FIG. 14.

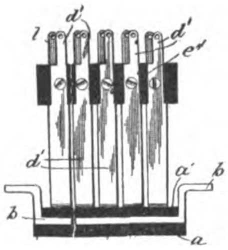


FIG. 15.

Perrie H Auxer, of Cleveland, Ohio, patents (No. 716,654) and assigns to Frederick P. Auxter and Carl P. Seyler a cable hanger. Figs. 11, 12 and 13 illustrate the device, which does not differ materially from other forms of cable clips.

William E. McCormick, of Chicago, Ill., patents (No. 716,460)

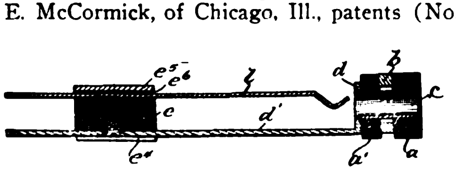


FIG. 16.

and assigns to the International Telephone Manufacturing Company a multiple switchboard. It is illustrated in Figs. 14, 15 and 16. This device admirably represents the change in construction which modern mechanical methods and machines can produce, and it is surprising to compare this jack with the old individually mounted affairs that occupy space in the switchboards to be measured by inches. The base of this jack is a longitudinal strip of metal, *b*, to which two strips of insulating material, *a* and a^1, are ttached. The thimble, *c*, forms the ring to each jack and is car- d through the strips of insulating material to the rear, and then the spring, *d*, is screwed on to the thimble. To this spring the strip of insulating material is attached, which carries the second spring, *l*.

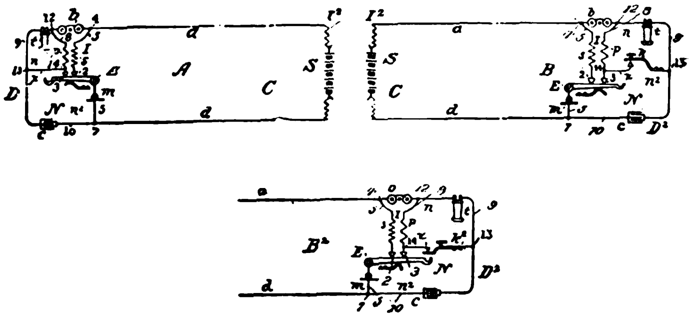


FIG. 17.

Almon B. Stetson, of Malden, Mass., patents (No. 716,779) and assigns to the American Telephone and Telegraph Company a telephone transmitter circuit. This device is essentially the equivalent of the old secondary cut-out used by the Bell Company and designed to prevent annoying side tones in the transmitter. Fig. 17 shows the device, which needs no further explanation.

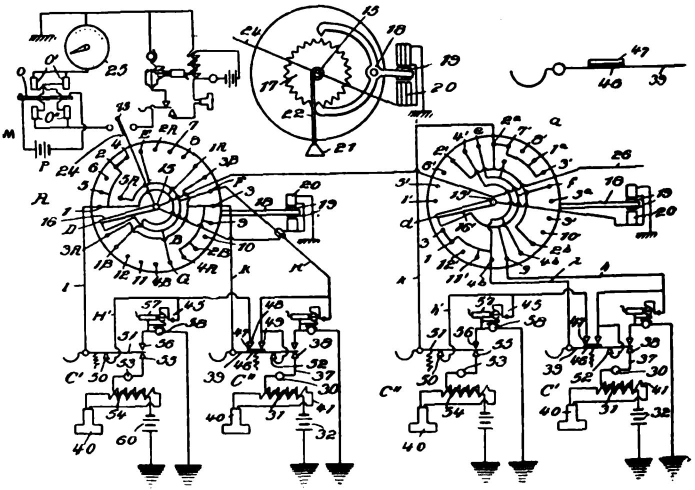


FIG. 18.

Wayne C. Wright, of Amarillo, Texas, patents (No. 716,802) a telephone system. The object of this invention is to provide a switchboard that will permit a subscriber in one town to call up subscribers in other towns without calling subscribers in his own vicinity. Fig. 18 shows the circuits which are operative. The question of making toll records is not touched on, and it is difficult to see how it would be possible to keep track of business transacted over such a switchboard and how the proper charges to subscribers could be estimated.

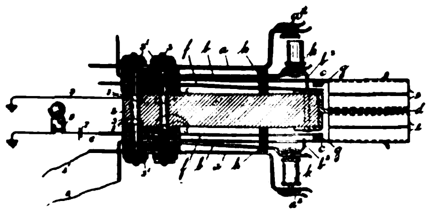


FIG. 19.

William Kaisling, of Chicago, Ill., patents (No. 717,212) and

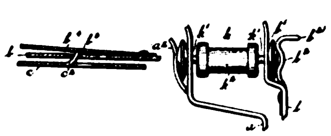


FIG. 20.

assigns to the Kellogg Switchboard and Supply Company a protective apparatus. The invention is illustrated in Fig. 19 and relates chiefly to the springs or other methods of mounting the carbon plates forming the lightning arresters and the heat coils with which it is now common to protect switchboards. The details of the invention are shown in Fig. 20 and are so clear as to render further comment unnecessary.

William A. Taylor, of Chicago, Ill., patents (No. 717,300) and assigns to the Kellogg Switchboard and Supply Company a current protective device. The patent is illustrated in Fig. 21 and covers broadly the device of protecting telephone circuits by arranging a special conductor of high resistance, which shall be heated by the passage of an abnormal current. To this high potential conductor a cap is soldered with metal of very low fusing point. When the high resistance conductor becomes heated, the solder melts and the cap under the action of the spring flies off, opening one side of the circuit, grounding the other and sounding an alarm. The device affects the old heat coil patent by using a rod of high resistance conductor, preferably made of carbon, in place of the former coil.

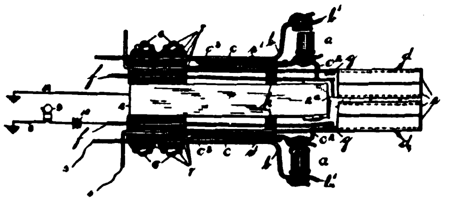


FIG. 21.

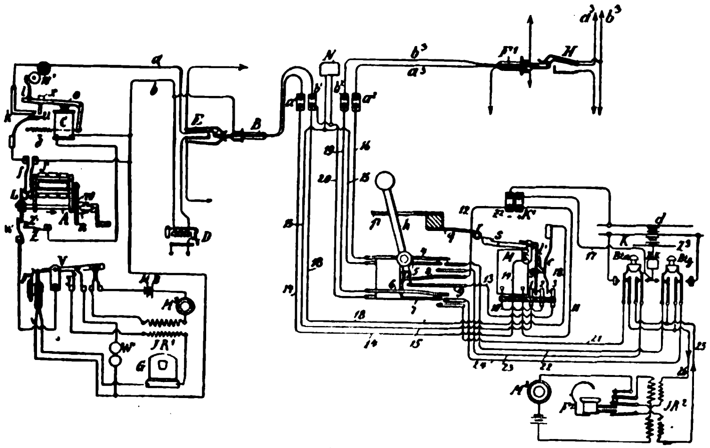


FIG. 22.

Johann H. Meyer, of Magdeburg, Germany, patents (No. 717,755) an automatic conversation counter for telephone exchange systems. The circuits of this invention are shown in Fig. 22. At the sub-station an electro-magnet is provided, carrying an escapement for operating one or more dials. The operator is provided with a key, whereby the impulses can be transmitted over the circuit, which excites the electro-magnet, and by means of the escapement, revolves the dials.

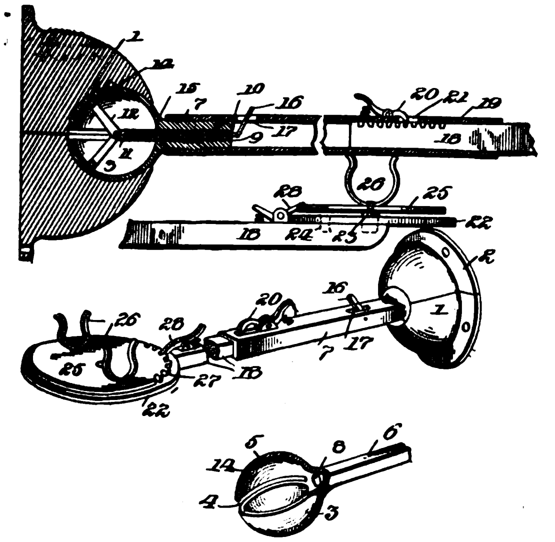


FIG. 23.

James B. McClain, of Washington, Pa., patents (No. 717,895) a telephone receiver holder. The invention, which is illustrated in Fig. 23, essentially consists of a ball and socket joint, to which a slidable arm is attached in such a manner as to permit the telephone receiver to be adjusted in any desired position.

William W. Dean, of Chicago, Ill., patents (No. 717,973) and assigns to the Kellogg Switchboard and Supply Company a testing system for telephone lines. This invention is illustrated in Fig. 24 and attacks the old method of making the busy test which in the modern switchboard requires three wires and substitutes an entirely different method, requiring only two wires. Essentially the invention consists in providing the cord circuit with a special relay, *x*, which is sensitive enough to be operated by the common battery used in the recent forms of switchboards. When a line is disengaged, there will be no potential on the test rings, but when any line is busy, then the rings of the multiple jacks will be connected to operate, and will have sufficient potential to operate the relay, *x*. When this relay is excited, this armature closes a supplementary circuit, which gives the customary click and the busy test in the operator's telephone. This patent not only evades the old busy test patent, but also reduces the number of wires required in the switchboard and permits the operator to test without producing sufficient noise to affect the subscriber's receivers. In these respects this invention is a distinct improvement.

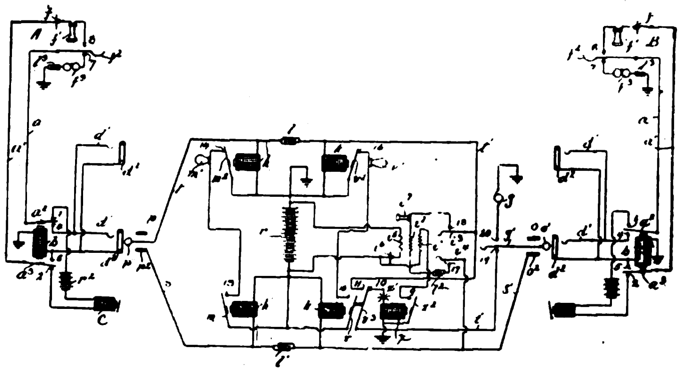


FIG. 24.

Fig 1

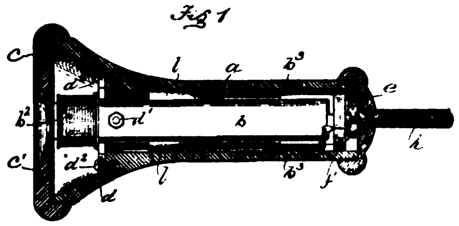


Fig. 2

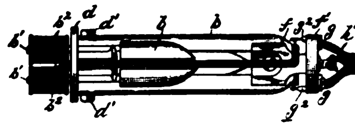
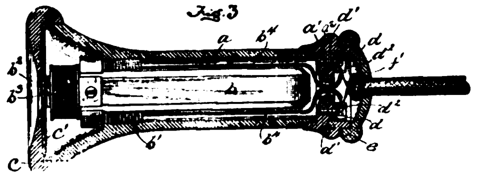


Fig 3



Kempster B. Miller, of Chicago, patents (Nos. 717,428 and 717,429) and assigns to the Kellogg Switchboard & Supply Company, a telephone receiver. No. 717,428 is illustrated in Figs. 1 and 2, and refers to an improvement in telephone receivers, whereby the terminals are subsequently attached to a disc F^1, screwed to the end of the receiver magnets; then the entire mechanism is slipped inside of the rubber shell A and a cap E slipped over the flexible cord containing the terminals and screwed in place. No. 717,429 is illustrated in Fig. 3 and is a modification of the previous patent. Here the receiver magnets are screwed in the rubber shell by means of a thread at b^1. Upon the end of the case a cap a^1 is threaded. The terminals are brought out through a hole in this cap and screwed to two binding posts d^1. A second cap *e* is then slipped over the flexible cord, containing the terminals and screwed into place. Both of these patents relate to methods of securing the receiver cord in such a manner as to conceal the terminals, to obviate any unexposed binding posts, cheapen manufacture and to render accurate adjustment of the instrument easy.

The Week's Messages.

NEW COMPANIES

MILTON, FLA.—The Gulf Coast Telephone and Telegraph Company, at Milton, has been incorporated with a capital stock of $3,000; incorporators, Lee Daniel, George B. Prior and Monroe Campbell.

BICKNELL, IND.—The Independent Telephone Company here has reorganized with a capital stock of $6,000. It takes the place of the old company, which was sub-licensed by the Bell Telephone Company. The company is composed of Joseph H. Barr, president; W. D. Lemon, vice-president; Frank McClure, treasurer; Emery Miller, manager; R. D. Barr, D. G. McClure, Walter Kensler.

INDIANAPOLIS, IND.—The People's Co-operative Telephone Company, of Tippecanoe, Clinton and Montgomery counties, has been incorporated with $500 capital. Incorporators, N. J. Bailey, J. O. Finch, M. P. Gaynor, W. E. Bryant and C. D. Shriver.

LIBERTYVILLE, IA.—The Libertyville Telephone Company has been incorporated with a capital stock of $7,000; Ed. Glotfelty, president; George C. Bowers, vice-president; D. W. Garber, secretary; S. K. Davis, treasurer.

ABELL, KY.—The Abell & Bell Telephone Company, of Nelson County, has been incorporated with a capital of $120.

KALAMAZOO, MICH.—The organization of an Independent telephone exchange in Kalamazoo has progressed to a point where its backers are willing to promise the installation of the service within a comparatively short time. Kalamazoo and Cleveland, Ohio, capital has been interested and the stock is all taken. D. S. Berry, who is back of the movement, was formerly with Mr. Ware, a well-known telephone man, in the Grand Rapids company. Some time ago they started negotiations to enter Kalamazoo, but the failure of the Everett-Moore syndicate so complicated their affairs that the matter was temporarily dropped. As things are once more progressing satisfactorily from all standpoints the movement to enter Kalamazoo has been taken up again and carried to a successful issue. Mr. Berry is in Cleveland and has wired local men interested that all negotiations at that end are complete. Organization and incorporation will be effected within a short time. Rates will be cut by the new company. It is proposed to make them $30 a year for business houses and $12 for residences. The rates of the Michigan Telephone Company are $36 for Blake instruments or $48 for metallic circuit in business houses and $18 for those in residences.

EASTON, N. Y.—The Easton and South Cambridge Telephone Company has been incorporated with the Secretary of State to build and operate lines from the village of South Cambridge to the village of Easton, thence through the villages of Easton and North Easton, with spurs running elsewhere in the vicinity. The capital stock is $3,000, consisting of shares of $50 each, and the directors are Edward Whiteside, Lawrence J. Dorsey, E. J. Skipp, L. W. Borden, F. O. Ives, E. H. Borden and Paul D. Ives.

CONNELSVILLE, PA.—Application has been made for a charter for the Union Telephone and Telegraph Company, which will be capitalized at $3,000,000. J. S. Bryner, of this town, is one of the chief promoters.

WILKESBARRE, PA.—A company has been organized in this city to construct and operate a telephone system in Cleburne, Texas, and adjacent cities. The following officers were elected for the ensuing year: President, F. M. Kirby; vice-president, F. B. McElroy, of Fort Worth, Texas; secretary, W. J. Trembath; treasurer, B. C. Allen; directors, F. M. Kirby, F. B. McElroy, W. J. Keith, W. J. Trembath, B. C. Allen, Frank W. Larned, G. M. Pace, F. J. Weckesser, A. D. Hay, Jacob Theis, A. C. Campbell and Dr. Henry Kunkle, of Kingston. The company owns some valuable franchises and will begin at once the construction of its lines, the capital being all subscribed.

ALBANY, TEXAS.—The Albany Telephone Company has been incorporated with a capital stock of $25,000. Incorporators: G. T. Reynolds, of Fort Worth; L. S. Hollowell and A. W. Reynolds, of Albany.

M'KINNEY, TEXAS.—A move is on foot for the organization of a new telephone company here by local capitalists.

WAVERLY, TEXAS.—The Waverly Telephone and Telegraph Company has been incorporated with a capital stock of $10,000. Purpose: The construction and maintenance of a long-distance telephone line through the counties of Freestone, Leon, Liberty, Limestone, Madison, Montgomery, Polk, San Jacinto, Trinity and Walker. Incorporators: J. C. Browder, J. H. Lewis and J. C. Hill, of San Jacinto County.

LEGAL.

FINDLAY, O.—The Findlay Telephone Company has won the suit brought by the city and carried to the circuit court to compel that company to reduce its telephone rates from $18 to $12 a year. The cheaper service was according to a now expired contract with the city. The court held that a municipality could not fix the price of telephone charges any more than the price of groceries.

RATES.

MOLINE, ILL.—To meet the competition of the new Independent Telephone Company the Central Union has announced a lower rate for residences in Moline and Rock Island. Persons who have heretofore paid $3.50 per month for a two-party line service, will be given a private line at $2.50 per month—for tri-city service. People who have heretofore paid $3 per month for a bi-city service will be given the complete tri-city service for half a dollar less. Then those who, in consideration of being content with a Blake set, have been given a $2.50 rate, will have solid back transmitter long-distance instruments installed. All the rates will become effective on the signing of new yearly contracts by the subscribers affected.

FRANKFORT, KY.—The Frankfort Telephone Company has issued a circular to its patrons announcing an increase of telephone rates from $18 to $24 for business houses and from $15 to $18 for offices.

INDEPENDENCE, MO.—The local office of the Bell Telephone Company has received instructions containing a new schedule of rates for residence telephones in Independence. The single line metallic circuit telephone will be $2 a month, two-party line, $1.75; four-party line, $1.50, and eight-party line, $1 per month. The rate is a reduction all along the line except for business telephones.

FINANCIAL.

DANVILLE, ILL.—The Vermillion County Telephone Company, of Danville, has increased its capital stock from $20,000 to $25,000.

KOKOMO, IND.—The Citizens' Telephone Company, of Kokomo, has increased its capital stock from $25,000 to $100,000.

WABASH, IND.—At the annual meeting of the stockholders of the Home Telephone Company of Wabash, to be held soon, the question of increasing the capital stock, which is now $20,000, or issuing 5 per cent. bonds secured by mortgage on the plant to liquidate existing indebtedness, and to extend the lines into the country district surrounding Wabash, will come up. The company has a small indebtedness and has invested more than $40,000 in its magnificent plant and to meet the growing demands for telephones cannot build the extension out of the earnings, but must construct the lines from capital account. The company is paying 6 per cent. dividends, has the telephone business of the city and vicinity and there is a brisk demand for the stock, while the bonds, if issued, will be quickly taken.

SALT LICK, KY.—The Salt Lick and Yale Telephone Company has increased its capital stock from $1,000 to $5,000, to be expended in building new lines and repairing old ones.

OAKLAND, MD.—The Garrett County Telephone Company has opened its books for an additional issue to the capital stock of the corporation amounting to $2,000. Shares sell at $10 each.

THE WEEK'S MESSAGES Continued.

CHELSEA, MICH.—The Chelsea Telephone Company has declared a semi-annual dividend of $1 per share.

MUSKEGON, MICH.—The Muskegon common council recently passed an ordinance placing an annual tax of 25 cents apiece on the poles of all telegraph and telephone companies operating in the city without local franchise.

MANKATO, MINN.—At a meeting of the stockholders of the Mankato Citizens' Telephone Company it was voted to issue $15,000 of preferred stock, at par, to bear 6 per cent. interest, the proceeds to be used toward paying for the improvements which the company has been putting in recently. This issue has already been partly subscribed, and the public is expected to quickly take the balance. The matter of putting in several new farmers' lines was talked over, but nothing will be done about this until the present work has been finished, which will be in about two months. All but seventy of the new telephones have been put in, and these will be put in within a couple of weeks. Twenty new ones have been subscribed for and will be put in as soon as possible. Five orders were received in one day.

ELMIRA, N. Y.—The New York State Telephone Company, which was recently incorporated, has filed a certificate in the county clerk's office making the announcement that it intends to extend its lines through Buffalo, Niagara Falls, Tonawanda, Dunham, Ripley, Rouse's Point, Whitehall, Lebannon Springs and Sag Harbor. This company is now capitalized at $2,000,000. Boyd McDowell, of this city, is attorney for the company and is also one of the stockholders and directors. The principal offices of the company will shortly be moved to Elmira.

MIDDLETOWN, N. Y.—At a recent meeting of a number of directors of the Orange County Telephone and Telegraph Company the matter of increasing the capital stock from $10,000 to $20,000 was considered and a vote taken was almost unanimous in favor of making the change. The annual meeting of the stockholders for the election of directors will be held shortly.

NIAGARA FALLS, N. Y.—A mortgage of half a million dollars has been filed in the office of the county clerk at Lockport. It was given by the Niagara County Home Telephone Company to the Empire Trust Company of Albany.

WARREN, OHIO.—The Jefferson and Warren Telephone Company has increased its capital stock from $60,000 to $80,000.

WAYNESFIELD, OHIO.—The Auglaize Telephone Company, of Waynesfield, has increased its capital from $5,000 to $15,000. Harper Stiles, president.

PITTSBURG, PA.—The Central District and Printing Telephone Company has declared its regular quarterly dividend of 2 per cent., payable January 31st.

PARIS, TEXAS.—The Citizens' Telephone Company has filed a mortgage in the county clerk's office in favor of the Guardian Trust Company, of Cleveland, Ohio, to secure payment of bonds issued for money to construct and complete its line in Paris and Lamar County, and for the purchase of property in Paris, the issue of bonds not to exceed $150,000.

LA CROSSE, WIS.—The La Crosse Telephone Company has filed an amendment to its articles of incorporation providing for the issue of $50,000 preferred stock in addition to $30,000 common stock.

ELECTIONS.

GALESBURG, ILL.—The annual meeting of the stockholders of the Galesburg Union Telephone Company was held recently in the offices of the company. About $100,000 worth of stock was represented and all present expressed themselves as more than well satisfied with the business and the progress of the year just past. Reports were heard from the different officers, showing that the business was on a substantial basis and warranting an endorsement of the directors by the stockholders. It was brought out in the reports that the company now has in active operation in its city exchange 1,515 instruments. The election of directors for the coming year resulted as follows: W. E. Terry, P. N. Granville, I. S. Callender, Nels M. Burgland, P. F. Brown, W. A. Olson, G. B. Churchill, W. E. Phillips, H. M. Chase, L. Weinberg and D. L. Peterson.

CLINTON, IND.—The Farmers' Mutual Telephone Company, of Clinton Township, at its annual meeting elected entirely new officers and added four members to its board of directors, making the directorate seven instead of three members. The new board of directors is as follows: Charles McConaughy, John Scrannage, Ed Bartholomew, John Smoker, C. R. Myers, Ira Hapner and Jacob Zollinger. The directors elected the following officers: President Charles McConaughy; secretary, Ed Bartholomew; treasurer, John Scrannage.

MT. VERNON, IND.—The Mt. Vernon Telephone Company has elected the following officers: James E. Harlan, president; E. B. Willix, vice-president; T. B. Garmley, secretary; J. B. Albrook, treasurer, and H. M. Kelley, general manager.

SILVER LAKE, IND.—The stockholders of the People's Mutual Telephone Company held their annual meeting at Silver Lake recently and besides the election of officers, did considerable other business which was thought necessary to add to the proficiency of the service. Provisions were made for a committee to draft a revision of the constitution, and it was decided to add two more directors to the board in order to better distribute the legislative power of the company. Following are the officers: Carlin Myers, of Mentone, succeeds H. L. Oldfather as president; A. D. Whitman, of Sidney, succeeds S. B. Flora as secretary; F. M. Jaques, of Silver Lake, takes the place of Harry Kline as treasurer. The board of directors consists of the following persons: Ephriam Wells and Frank Brown, of Silver Lake; Charles Fisher, of Sidney; Elmer Vandemark, of Burket, and Frank Bowman, of Mentone.

CHEBOYGAN, MICH.—The directors of the Cheboygan Telephone Company, which has just been reorganized, held a meeting recently and elected the following officers: President and manager, William H. Blake; treasurer, A. W. Ramsay; secretary, J. C. Wooster.

KANSAS CITY, MO.—The Home Telephone Company held its annual election recently. All the stock was represented either by personal shareholders or by proxy. The new officers and directors chosen are as follows: J. J. Heim, Kansas City, president; Henry Koehler, Jr., St. Louis, first vice-president; Ed L. Barber, Wauseon, O., second vice-president; O. C. Snider, Kansas City, secretary and treasurer; directors, J. J. Heim, Kansas City; O. C. Snider, Kansas City; Ed. L. Barber, Wauseon, O.; James S. Brailey, Jr., Toledo; A. Kalman, St. Paul; Max Koehler and Henry Koehler, Jr., St. Louis; E. L. Benoist, St. Louis; A. W. Lambert, St. Louis; Hugh C. Ward, Kansas City; Walter S. Dickey, Kansas City; J. J. Swofford, Kansas City. The new board and officers assume charge of the company at once. "We have been considering details of the work for some time," said Mr. Kalman, "and also plans for our new building, but of course have done nothing definite about accepting the latter yet." It was announced that the work of putting in conduits would be pushed from now on, a much larger force of men being engaged to do it hereafter. The setting of poles has been largely done, but considerable more remain to be placed. The plans of the company for Kansas City, Kas., have been filed there. The plan is to have both exchanges open at the same time, but of course there is not much work demanded across the line, hence the later beginning will still permit that. The directors have voted a bond issue of $3,000,000 to be used in construction and equipment in Kansas City. Of this amount $1,700,000 will be used in the construction of lines now under way or in contemplation. The $1,300,000 bonds remaining will be held as a reserve for the construction of extensions that may be made in the future.

ST. JOSEPH, MO.—At the annual meeting of the stockholders of the Citizens' Telephone Company Dr. J. J. Newell, M. M. Riggs, Thomas W. Evans and Ed. F. Newell were re-elected members of the board of directors. The directors re-elected the present officers of the company as follows: Dr. J. J. Newell, president; M. M. Riggs, vice-president; Thomas W. Evans, secretary; Ed. F. Newell, treasurer. The Citizens' Company is prepared to make additions to its plant that will greatly improve the service. The capacity of the plant is being increased by the addition of 1,000 instruments. This, with the number now in use, will give a capacity of 2,100 telephones. The company is also installing a new switchboard in South St. Joseph, with a capacity of 2,000 instruments, almost the same number in use at the main exchange uptown. Dr. Newell says the plant is to be entirely overhauled and improved during the year. He says the company will also reach out for additional business Among other things which the Citizens' Company contemplates is a complete rural telephone system that will connect direct with the St. Joseph exchange. President Newell says it is proposed to connect every farmhouse in Buchanan County with the local exchange, if it desires the service. Plans have already been approved for constructing five and ten-party lines into the country southeast from this city, and a perfect network of wires will be strung all over the county as soon as the necessary materials can be procured.

TRENTON, N. J.—The Interstate Telephone Company has elected these directors: William S. Hancock, Barker Gummere, Jr., Hugh H. Hamill, Edward C. Stokes, H. C. Loudenslager, Richard P. Wilson, C. W. Kline, of Hazleton, Pa.; John Markle of New York; C. E. Mitson, of Philadelphia; M. E. Ingall, of New York; Thomas Dougherty, of Atlantic City; F. A. Demarest and A. M. Warstall. The officers elected are as follows: President, C. W. Kline; secretary, A. M. Warstall; treasurer, Barker Gummere, Jr.; superintendent, F. A. Demarest. A resolution was passed providing for the completion of the original plans calling for the extension of the system throughout the State and making connections with other Independent companies in New Jersey and Pennsylvania.

CORTLAND, N. Y.—At a meeting of the stockholders of the Cortland Home Telephone Company, the following directors were elected for the ensuing year: C. D. Ver Nooy, C. P. Walrad, R. L. Davis, William Martin, H.

THE WEEK'S MESSAGES—Continued.

L. Smith, W. H. Foster, A. S. Burgess and F. E. Price. At a subsequent meeting of the directors the following officers were elected: President, C. D. Ver Nooy; vice-president, C. P. Walrad; treasurer, G. J. Mager; secretary, H. L. Smith; attorney, R. L. Davis; manager, F. V. Bennett.

GLOVERSVILLE, N. Y.—At the annual meeting of the Glen Telephone Company, held in this city, the following were elected: President and general manager, J. S. G. Edwards; vice-president, Charles B. Knox; secretary, Edward S. Parkhurst; assistant secretary, A. A. Turnboul; treasurer, Howard A. DeGraff; directors, C. B. Knox, L. N. Littauer, D. A. Hays, E. S. Parkhurst, H. A. DeGraff, T. W. Smith, G. Levor, J. S. G. Edwards, John Martin, A. A. Turnboul, W. A. Smith and G. Leon. The report of the treasurer showed the company to be in a very flourishing condition. The new switchboard recently placed in the Gloversville office with a capacity of fifteen hundred telephones is nearly full, as well as the one recently placed in the Johnstown office, with accommodations for three hundred subscribers, and it was decided to add another board to each office of a capacity as great as those just installed.

HORNBY, N. Y.—The Telephone Company of Hornby held a business meeting recently and elected the following officers: President, H. T. Jimerson; vice-president, Edward Dodge; secretary, E. J. Easterbrook; treasurer, C. C. Roloson.

MEREDITH, N. Y.—At a meeting of the Meredith Telephone Company the following directors were elected: John W. Gibson, J. M. Graham, T. M. Ware, Howard Bundy, Horace Hanford, Emmet Fisher, R. R. Mackey and William Brown. The company built a number of miles of line during the past year and is in good shape, both financially and otherwise. At a subsequent meeting of the directors, the following officers were elected: President, John W. Gibson; vice-president, T. M. Ware; secretary and treasurer, J. Milo Graham.

ROCHESTER, N. Y.—The stockholders of the Stromberg-Carlson Telephone Manufacturing Company held their annual meeting recently and elected the following directors: Alfred Stromberg, Thomas W. Finucane, Androv Carlson, Eugene H. Satterlee, Frederick Cook, Charles E. Angle, Walter B. Duffy, Charles A. Brown and John C. Woodbury. Two inspectors were also elected—Arthur J. Mahon and John T. McIntyre. The directors elected these officers: President, Eugene H. Satterlee; vice-president, Alfred Stromberg; treasurer, Thomas W. Finucane; secretary, Charles E. Angle.

UTICA, N. Y.—The annual meeting of the Utica Home Telephone Company was held recently. The following directors were elected: Edward B. Odell, Ed. L. Barber, Henry F. Miller, T. H. Ferris, C. H. Poole, Eduard Bushinger. William S. Foley and Francis P. Miller were chosen inspectors of election. The officers elected are: President, Edward B. Odell; vice-president, Henry F. Miller; treasurer, Eduard Bushinger; secretary and manager, Charles H. Poole.

BEAVER, O.—The stockholders of the Beaver Telephone Company have elected the following directors to serve for the ensuing year: P. W. Sprinkle, Robert Hunter, N. Wisler, G. S. Beard, Lee Longanecker, Joe Harrold, W. H. Ruhlman, R. B. Metzler, Sol. Heck. R. B. Metzler was elected treasurer and John Yoder secretary.

BELLEFONTAINE, O.—The stockholders of the United Telephone Company held their annual meeting in Bellefontaine recently and elected the following directors: J. O. Angell, Bellecenter; R. F. Coppess, Alger; L. W. Fawcett, Rushslyvania; W. H. Fledderjohann, New Knoxville; J. C. Moore, West Mansfield; F. L. VanGorder, Lakeview; C. G. Weller, Degraff; Will Harris, East Liberty; W. W. Fisher, W. C. Huston, F. N. Johnson, G. M. Stevenson, J. H. Wilson, J. B. Williams and C. E. Yoder, Bellefontaine. The directors elected the following officers: President, W. W. Fisher; first vice-president, W. H. Fledderjohann; second vice-president, C. E. Yoder; third vice-president, L. W. Fawcett; secretary, G. M. Stevenson; treasurer, W. C. Huston.

SWIFT, O.—The Muskingum Valley Telephone Company recently incorporated with a capital stock of $5,000. At a recent meeting held at Swift the following officers were elected: E. B. Vincent, president; Arius Lawrence, vice-president; W. W. Mason, secretary and general manager; A. Nickerson, treasurer. The company will at once commence to build their lines from Swift Station to Marietta, via Beverly and Lowell. The company will use the latest and most up-to-date telephones, and both Beverly and Lowell will be equipped with central exchange plants. The lines and poles will be the best that money can buy.

HARRISBURG, PA.—At the annual meeting of the Cumberland Valley Telephone Company these officers were elected: B. F. Meyers, president; W. D. Barnard, Philadelphia, vice-president; S. R. Caldwell, Philadelphia, treasurer, and Frank E. Ziegler, secretary. The officers and these men compose the board of directors: Ward R. Bliss and R. G. Park, West Chester; C. M. Clement, Sunbury; Meade D. Detweiler, Patricio Russ, Harrisburg; F. P. Spiese, Tamaqua; T. J. O'Neil, C. J. Dellone and H. N. Gitt, Hanover; S. L. Johns, McSherrystown; S. P. Light, Lebanon. The purchase of the Baltimore & Cumberland and two other Maryland companies was ratified. The company declared a one per cent. dividend a short time ago.

PITTSBURG, PA.—The annual meeting of the stockholders of the Valley Telephone Company for the purpose of electing a board of directors for the ensuing year was held here recently. The following were chosen directors: James E. Davidson, Orrin Bump, Benjamin Boutell, Bay City; John L. Jackson, Luther Holland, Daniel W. Briggs, Saginaw. The directors will elect officers at a subsequent meeting. The company has had a prosperous year, and its business is steadily increasing. R. F. Johnson is the efficient secretary of the company.

PITTSBURG, PA.—A number of changes, it is said, are promised at an early date in the management of the Pittsburg & Allegheny Telephone Company. R. E. Bouton, who is president of the company, it is said, intends resigning that office to take up the development of a Baltimore suburb. Mr. Bouton has already resigned the presidency of the Maryland Telephone and Telegraph Company, the parent company of the Pennsylvania & Allegheny, and has been succeeded by George R. Webb, who was chairman of the executive board of the company.

BELMONT, W. VA.—The stockholders of the Belmont Telephone Company held their annual meeting at the office of President J. C. Heinlein, and the new board of directors were elected. The old members, Messrs. J. C. Heinlein, J. C. Dent, Dr. A. J. Heinlein, R. B. Mitchell, T. B. Driggs and Henry Schmulbach, were re-elected, and three new members were added. They were E. G. Smith, of Martins Ferry; Hon. C. L. Weems, of St. Clairsville, and J. W. Doudna, of Barnesville. The report of the condition of the system and the affairs of the company were more than satisfactory.

COMBINATIONS.

CARROLLTON, GA.—The Gainesboro Long Distance Telephone Company, of this city, has just bought out the Cedartown Exchange and added this extensive service to its system. The Gainesboro company, which entered this field, locating headquarters at this place some thirty months ago, have ramifications of their system penetrating almost every district in this county and numerous lines and a score of pay stations in adjoining counties. A few weeks ago it finished a gap from Buchanan, the county seat of Haralson County, to Cedartown, the county seat of Polk, a distance of eighteen miles. On this important extension were established stations at Youngs, Felton and other points. Soon after entering Cedartown the acquisition of that exchange became of interest to this company.

DUBLIN, GA.—J. E. Smith has sold his interest in the Macon and Dublin Telephone Company to A. Daus and E. Eisbaum, of Macon, and Clark Grier and F. F. Scarborough, of Dublin. These gentlemen have applied for a charter for the company. The capital stock is $6,000. The telephone lines run from Dublin to Macon and from Dublin to Sandersville.

SAYBROOK, ILL.—Harry Van Gundy, of Ellsworth, has purchased the telephone exchange of A. T. Wood.

CHERRYVALE, KAS.—The Cherryvale telephone exchange has changed hands and extensive improvements are to be made on the system.

FRANCHISES.

PASADENA, CAL.—The City Council has ordered a telephone franchise to be advertised for sale at public auction. A. R. Metcalfe and F. F. Graves have asked for franchises.

SALIX, IA.—The town of Salix at a special election granted a franchise to J. H. Quick, of Sioux City, and R. H. Countermine, one of the leading merchants of this place, to operate a telephone exchange here. It is expected that the exchange will be established at once.

SIOUX CITY, IA.—The first step in the campaign of the Tri-State Telephone Company to obtain a franchise in Sioux City has been taken. Senator E. H. Hubbard, representing the allied Independent companies, appeared before the council in behalf of his clients and presented an ordinance granting the Independents a franchise in Sioux City. The ordinance was placed on its first reading and then referred to the committee of the whole. Senator Hubbard in a brief address explained the position of the petitioning companies. He said that the Independent Iowa companies desiring to enter Sioux City expected to have associated with them Independent companies of Nebraska and South Dakota.

WASHTA, IA.—The Farmers' and Merchants' Telephone Company has been granted a local franchise at Washta.

CLAY CENTER, KAS.—G. M. Stratton has been granted a franchise by the City Council of Clay Center to build a telephone system.

LAUREL HILL, KY.—The Laurel Telephone Company has been granted a franchise to operate a local line in Wood Township. The officers are C. E. Borders, president; Clyde L. Schleisher, secretary; Faris Jackson, W. R. Jackson and E. J. Ross, directors.

EXCELSIOR SPRING, MO.—The Excelsior Springs Telephone exchange has been granted permission to build telephone lines along highways of Ray County.

THE WEEK'S MESSAGES Continued

MEMPHIS, MO.—A telephone franchise was granted M. V. Jackson, O. E. Green and C. M. Moffett, line to extend from Memphis to Sand Hill.

OMAHA, NEB.—The Board of County Supervisors has granted the petition of the Boomer Mutual Telephone Company for permission to use the county roads for its poles and wires. The line which the company proposes to construct will start at the southeast corner of section 1, in Boomer Township, and will run west a distance of about ten miles. S. A. Tamisiea is secretary of the company.

LEBANON, N. J.—The Tiffany Telephone Company has been granted a franchise to erect lines in Lebanon Township.

WHITESBORO, N. Y.—An application has been received from the Utica Home Telephone Company for the right to erect poles, string wires and conduct a general telephone business in this place. If given a franchise the company agrees to give an unlimited service for $36 a year. The application has been referred to a special committee.

OTTAWA, O.—The Village Council has granted a franchise to the Farmers' Home and Country Telephone Company.

McKEESPORT, PA.—At a recent meeting of the Common Council, the franchise of the Pittsburg & Allegheny Telephone Company was extended until July 31, in order to give the company time to construct its underground system and exchange. The company was granted a franchise in January, 1902, which expires the last of this month. The matter will now go to the Select Council, which, it is thought, will concur.

MAUCH CHUNK, PA.—The City Council has granted a franchise to the Carbon Telephone Company.

OGDEN, UTAH.—The Home Telephone Company and the Bell Telephone Company have asked for fifty-year franchises here. Council is in favor of granting but one franchise, and is investigating the merits of the two systems.

FAIRMONT, W. VA.—The Augusta Telephone Company has been granted a 50-year franchise by the City Council of Fairmont. A large order for poles has been placed, and active construction work will begin in a short time.

CONSTRUCTION.

LAKELAND, FLA.—The Peninsular Telephone Company, which opened an exchange in Lakeland last February with a switchboard calculated to do for the town for at least five years, has had to order another one of double the present capacity, so rapidly has the business grown.

BROWNING, ILL.—G. W. Mitchell, of near Browning, is putting in a telephone and will connect with the Baders Telephone Company at Browning.

CARLYLE, ILL.—The Southern Union Telephone Company is making preparations for extensive improvements to its system in Clinton County. Toll lines will be built to Keyesport, thence to Boulder. The right of way has already been secured along the route to Keyesport. Extensions will also be made from Germantown to Bartelso, thence to Posey and Hoffman.

WAUKEGAN, ILL.—An Independent telephone system is projected here by the Western Telephone Construction Company. Its agent, J. E. Keelyl, is offered such liberal patronage that he promises to have a large exchange in operation here inside of sixty days. After a large list of subscribers is secured by Mr. Keelyl and the exchange put in, a local company is to run the business. The company is installing exchanges along the lake shore.

LAFAYETTE, IND.—Efforts are being made to have the Lafayette Telephone Company construct a line from here to South Raub, to connect with the South Raub Co-operative Telephone Company.

PETERSBURG, IND.—The Independent Telephone Company here has begun the construction of toll lines into Princeton, Washington and Vincennes. The company reports a prosperous year in finance and service. It has been running since July 1.

FOREST CITY, IA.—The Great Northern Telephone Company is preparing to push construction of lines in the spring.

KINSLEY, KAS.—The Kinsley Telephone Company has recently completed a toll line from Kinsley to Lewis, a distance of about ten miles. This work will be doubtlessly continued to other towns on the Santa Fe extension early in the year.

WILMONT, MINN.—It is very probable that the Farmers' Telephone Company of Fulda will construct a line to this city.

LEBANON, N. J.—The Farmers' and Merchants' Telephone Company has extended its line to Lebanon. The line is to be extended to Whitehouse, High Bridge, Glen Gardner and Junction within a few weeks.

TRENTON, N. J.—The City Council has appropriated $40,000 for the purpose of installing fire and police wires.

BUFFALO, N. Y.—The Ontario Telephone Company, of Onondaga and Oswego counties, has filed with the Secretary of State an amended certificate of incorporation, under which it will operate in Fulton, Oswego, Seriba, New Haven, Mexico, Richland, Sandy Creek, Volney, Schroeppel, Hanibal and Granby, Oswego County, and Lysander, Clay, Salma and Liverpool, Onondaga County.

CATSKILL, N. Y.—Superintendent W. J. Conlon, of the West Shore Home Telephone Company, is connecting the switchboard and apparatus for the new system. The underground cable has arrived. Frank Westbrook, of Ohio, who has charge of all the company's cable work, will superintend the pulling and splicing of the underground and aerial cable and its connection to the switchboard. The switchboard was manufactured by the Rawson Telephone Electric Company. As soon as the weather is favorable the company will push the lines through to Albany and Kingston. There are at present 1,200 telephones working in Albany, and it is expected there will be as many more when the local system is in working shape. There are already lines connecting Albany and Schenectady, Cohoes, Watervliet and Troy.

ONEONTA, N. Y.—The Oneonta Telephone Company, with over 400 telephones upon the local exchange, finds the present switchboard facilities inadequate, and it has been decided to purchase another.

ATHENS, O.—The Citizens' Telephone Company will install a new switchboard here in the near future.

FREMONT, O.—The Home Telephone Company to give better service will install new switchboards. The change will not be made for some time, and it is possible the company will issue additional stock.

NORWALK, O.—The Norwalk Telephone Company will install a new switchboard and other office equipment and has employed Leroy Stanton, a Cleveland electrical engineer, to look after the matter, and within a month or two the new equipment will be in place. The old board has never given satisfaction, and its slow action has caused any amount of trouble to the patrons of the company and to the operators as well.

HONESDALE, PA.—The Citizens' Telephone Company will make general overhauling of its line at this place. A large number of men will be employed in changing and replacing with new cables, wires, cross-arms and switchboards, and thousands of dollars will be expended to increase its already large and excellent service. Superintendent Dusinberre says that after this work is completed new poles will be put in from Waymart to Carbondale, which will connect Honesdale with the Lackawanna Valley, Philadelphia and all cities in line with the Quaker City. This work will probably be completed by the middle of 1903.

INDIANA, PA.—The Indiana Telephone Company has purchased a lot on which it will erect a two-story brick building, to cost from $3,500 to $5,000, which it will use entirely for the accommodation of its business.

JOHNSTOWN, PA.—The directors of the Johnstown Telephone Company have voted to spend between $50,000 and $100,000 in improving its system in this city.

LANCASTER, PA.—The United Telegraph and Telephone Company has been awarded the contract for the reconstruction of the police patrol system.

PHILADELPHIA, PA.—C. H. Dennis, representing the Eastern Telegraph and Telephone Company, of this city, is touring the Peninsula in the interest of the company. The Eastern is on its way down the Peninsula, and will soon reach many of the principal towns.

DEADWOOD, S. D.—A number of eastern capitalists have engaged George W. Cornwall, of Deadwood, to proceed to Old Mexico and prepare to construct and operate an extensive telephone system, centralizing in the City of Mexico. Mr. Cornwall recently resigned as manager of the Harrison Telephone Company in the Black Hills. He built the company's system here, and sold his interest a year ago to a Chicago syndicate.

HEATHVILLE, VA.—The board of directors for the Northern Neck Telephone Company at a recent meeting decided to run a new telephone line from here to Wicomico and Reedville. This line when it is completed will be a great convenience to the public, as both Wicomico and Broun's store are busy little towns, and heretofore all of their communications with the outside world was by mail.

CHIPPEWA FALLS, WIS.—At a meeting of the stockholders of the Chippewa County Telephone Company it was decided to extend the line into this city in the spring and establish an exchange office. The line touches all important points in the county excepting this city. The system in this city will be underground and cost about $30,000. There are already over 200 subscribers in the county.

MISCELLANEOUS

MOLINE, ILL.—At a recent meeting of the retail merchants decided action was taken against the Central Union Telephone Company, a committee being appointed to solicit signers to the following pledge: "We, the undersigned retail merchants and business men, agree to use only one telephone in our business houses and residences, and when the Union Electric Telephone and Telegraph Company has all its lines completed in Moline, Rock Island and Davenport, we agree to adopt that telephone exclusively."

THE WEEK'S MESSAGES Concluded.

PERSONAL

LOS ANGELES, CAL.—Clarence Cook has resigned his position with the Home Telephone Company, to become manager of the Harrison Telephone Company, of Deadwood, S. Dak. The Deadwood District comprises six exchanges and several toll stations. Edward Cook has resigned from the Central Union Telephone Company as State Inspector for Ohio. He is now assistant engineer to Charles Zahm, of the Home Telephone Company, of this city.

CAIRO, ILL.—W. H. Murphy, of Columbus, Ohio, will succeed J. J. Speed as manager of the Cairo Telephone Company. Mr. Speed resigned recently to accept a position elsewhere.

LARNED, KAS.—At the November election, Dr. A. A. Sharp, president and principal owner of the Larned Telephone Company, was elected a member of the State Legislature from the Ninety-sixth Judicial District.

HANNIBAL, MO.—H. G. Conger, who will have the management of the exchange of the Bluff City Telephone Company, is in the city and will remain several days looking after the work. He is now manager of the exchange at Mt. Pleasant, Iowa, but as soon as he can secure some one to take his place there he will remove to Hannibal.

CUBA, N. Y.—H. F. Wilcox has assumed the management of the Cuba Telephone Company's system, vice G. H. Swift, who superintended the installing of the system and has since had charge of the company's affairs. The Cuba Telephone Company's lines now extend from Cuba to Clarksville, New Hudson, Black Creek, Abbots and Haskell Flats, with nearly 250 telephones in use by subscribers. Mr. Wilcox, the new manager, is now arranging for a number of improvements in the system.

TRADE NOTES

JOHN A. ROEBLINGS SON'S COMPANY have been awarded the contract for furnishing all overhead and underground cable for the system of the Kansas City (Mo.) Home Telephone Company.

THE CHICAGO PAY STATION COMPANY has recently added to its line of apparatus a desk telephone holder which has a number of very good features, one of which is the small amount of space occupied and the manner in which it is adjusted to the desk, enabling the user to talk over the telephone without disturbing the papers on the desk. This company anticipates a largely increased business during the present year.

THE W. G. NAGEL ELECTRIC COMPANY, of Toledo, Ohio, has booked several large orders for March shipment, which leads the company to think that the present year will exceed even the one just past in the development of the Independent telephone movement. This firm's sales on their "Ready" specialties have continued through the winter months and they are preparing for spring rush, not only on these, but their general line of telephone supplies.

THE ONLY MANUFACTURING COMPANY, Moravia, Iowa, has just put a tie-wire former on the market. This device is one that must appeal to every man engaged in any way in constructing telephone systems. As the name of the company indicates, this is the *only* machine ever made for forming tie-wires. Tie-wires have always been made by hand. Hand-made tie-wires are imperfect and tedious to form. Besides this, wires of No. 12 and larger are very stiff and unwieldly. The Only former is extremely simple, strong and easily manipulated, anyone being able to work it. The tie-wires formed by it are perfect, besides which it uses smaller pieces of wire than can be used by hand. As a labor-saving device and one that will help improve construction the Only former ranks high in inventions of recent years.

BOOK REVIEW

CHARLES TRIPLER CHILD, late technical editor of *The Electrical Review*, shortly before his death, completed a little book on the properties and practice of electricity. It is called "The How and Why of Electricity." Telephone men will be particularly interested in that part of the book which treats of telephony. A study of the entire work, will, however, give a beginner in the telephone industry, a very clear insight into the principles which form the basis of all electrical apparatus, including the telephone. Mr. Child devotes two chapters to this branch: "The Telephone" which describes the actual talking apparatus, and "Telephone Accessories" which deals with the machinery to enable subscribers to talk with each other. The book is written in clear, clean-cut style in language, which although semi-technical, is plain and comprehensive to the beginner and the advanced engineer as well.

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

TWO TELEPHONE EXCHANGES of 325 telephones in Missouri towns only 8 miles apart, 21 miles metallic and 30 miles grounded toll lines. Both exchanges and nearly all toll lines rebuilt this year and in first-class condition. Present owners desire to sell on account of too much other business to look after. Address LOCK BOX 4, Malden, Mo.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

INVESTMENT OPPORTUNITY.—Telephone plant, 1 year old, 195 subscribers, 85 miles toll lines in booming town, 4,000; connections with Independent long-distance lines in view. Good reason for selling out. Address A, care of AMERICAN TELEPHONE JOURNAL, N. Y.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

POSITION by an all-round telephone man, as manager of small exchange or as inspector or troubleman. At present with Bell company. Address W. M. G., care AMERICAN TELEPHONE JOURNAL.

POSITION WANTED by young man of experience and thorough reliability, with ability to give an exchange the care and attention it should have. It may be to your interest to write me, stating salary. Address RELIABILITY, care AMERICAN TELEPHONE JOURNAL.

A COMPETENT MAN to take charge as Manager of a 200-subscriber telephone exchange. Position permanent on merit. Address Box 212, Milford, Indiana.

TELEPHONE SUPPLY SALESMAN with 15 years' experience as superintendent construction, manager operating department, right of way buyer, and salesman and installer of pay stations in U. S. and Canada, will be open for position January 15th. Address G. N. J., care THE AMERICAN TELELPHONE JOURNAL, New York.

POSITION WANTED by strictly temperate man, 25 years old, with seven years' experience in Independent and Bell systems. Experienced in all branches of work. References from former and present employers. South preferred. Address EXPERIENCE, care AMERICAN TELEPHONE JOURNAL, New York.

I WANT the exclusive handling of an account, for Chicago trade, beginning January 1st. Manufacturers' Agency basis. Address SALESMAN, care AMERICAN TELEPHONE JOURNAL, Monadnock Building, Chicago.

FORMER assistant exchange manager in charge of 2,900 subscribers, New York City, is open for position. Age 29, technical graduate, broad business experience. Address R. A. D., care THE AMERICAN TELEPHONE JOURNAL, N. Y.

The American Telephone Journal

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THE EVOLUTION OF THE TELEPHONE SWITCHBOARD*

By Thomas D. Lockwood

Up to about 1884, there was no uniformity in switchboard apparatus; and there was no standard switchboard. Calls were to be received, and signal receiving appliances therefore were to be provided. Calls were to be answered and orders received, and for this purpose means were requisite to connect the operators' telephones with a call-originating line. Before connection could be established, it was essential to ascertain whether such wanted line might not be already engaged, and for this ready means of communication between the operators was necessary. If occupied, the fact had to be reported to the call originator. If not, a call signal had to be sent to the station wanted; and thus means for sending signals was also essential; and finally some device had to be rearranged for the indication and reception of ring-off signals.

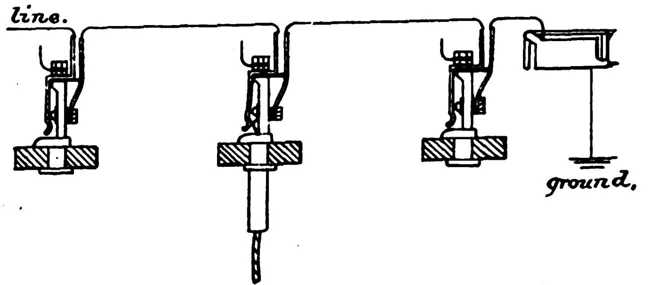

FIG. 1.

Upon the commercial introduction of the multiple switchboard, which, though invented as early as 1879, did not obtain general acceptance until about 1884 or 1885, it semed that the time for organizing these several devices into a complete and self-contained machine had arrived.

The very fact that all of the incoming substation lines were represented by switch-sockets, and were accessible at each of a plurality of switchboards or switchboard sections, rendered further invention imperative. It became absolutely necessary to provide some means whereby the operator at any one of the sections could quickly find out for herself whether a line called for, was or was not "busy." Accordingly, such means were devised. Without a "busy test" the multiple switchboard would be little better than a theory. Provided with a busy test system it becomes the practical basis of continued subsequent improvement.

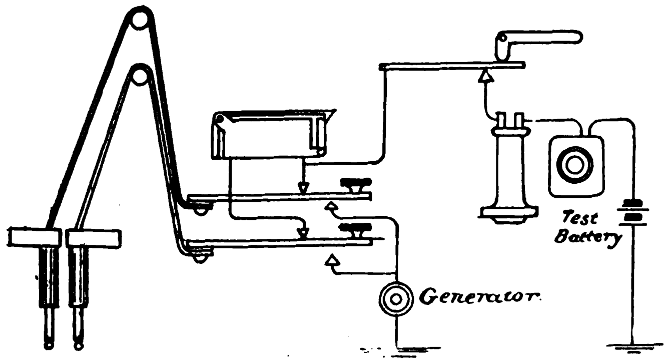

Fig. 2.

Scores of "busy test" arrangements have been proposed; but few are really practical. In that which was associated with the earlier multiple switchboards, the socket frames of every line were represented on the face of the board by a metal ring surrounding the plug-hole; and all the metal rings of all of the sockets of each line were permanently united to one another by a wire running along at the back. The shank of the switch-plug was also wholly of metal, and when inserted in the socket of any line at any board it acted to establish a conductive connection between the telephone line proper, and the conductor uniting the metal rings, thus grounding the latter, since the telephone line was grounded at the sub-station. A small battery was included in circuit with the operator's telephone at each section-operator's position and keys were provided whereby the telephone might be looped into any one of the switch-cords a number of which were placed at each position. Thus to test at any section for the ground, cross, or other abnormal condition, which would indicate that a wanted line was engaged at some other section, it was merely necessary to touch the tip of the switch-plug to the metal ring (hence termed the "test ring") of the socket, which at such section represented the line called for. Should the wanted line be busy, a portion of the current of the small battery, would pass by way of the test ring and the tip of the plug through the operator's receiver and produce a clicking sound therein; but if the line when thus tried were disengaged, no such sound would be heard. In the multiple switchboard of that period, the jacks or sockets of the lines at each section were arranged in panels over the front of the board; the call devices were annunciators arranged in banks below these panels; the switch-cords with plugs at each end hung from a kind of gallows frame above; and on a keyboard in front of the operator were keys associated with the several switch-cords respectively, for directing the call current over any line switched to any particular cord, and for similarly connecting the operator's telephones in the circuit of any cord to answer calls, and to talk with either subscriber. The disconnecting annunciators, one for each switchcord, were mounted on a single row at each section. The circuits were of the single wire type with earth return; the switch-sockets of the

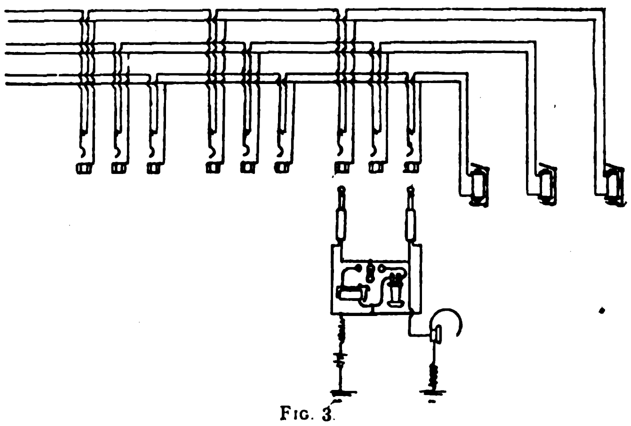

Fig. 3.

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*Abstract of a paper read at the 172d Meeting of the American Institute of Electrical Engineers, New York, January 23, 1903.

several lines—one for each line at each section—each had a spring and point contact, and these contacts as indicated in Fig. 1, were all in series in the line.

As arranged for the switchboard of that period, the operators' telephones common to all cords of the section, were connected in an earth branch of the cord conductor; and the disconnecting annunciators, one for each switch-cord, were each connected directly in the circuit of its own cord. Fig. 2 indicates this arrangement.

It was very soon observed that the manipulation of switch-cords hanging from a point above, was a strain upon the operators, besides being in other respects inconvenient; and soon their position was changed, and the plugs were made to rest with the calling and listening keys on the keyboard, the cords hanging below with a weight for each, to keep it taut, and for its automatic retraction. Then it was noted that the speed of operation was restricted because on the receipt of a call signal, the jack of the line, the call of which was to be answered had to be found in the panel where it and adjacent numbers were placed. There was provided for each line at the section where its calls were answered, an additional switch-socket to be used for the answering plug of a pair, and in responding to calls only. This was termed the "answering jack," and was placed close to the call signal of its own line.

After some four or five years' use of grounded circuit multiple switchboards it became evident that the time for the inductively neutral metallic circuit had arrived. This advance was a radical one, and followed the introduction of underground wires, almost as a matter of course. The series mode of arranging the spring-jack contacts was at this time retained, these being in one conductor, while the other main conductor was connected by parallel branches to the test rings of the circuit at the several sections respectively.

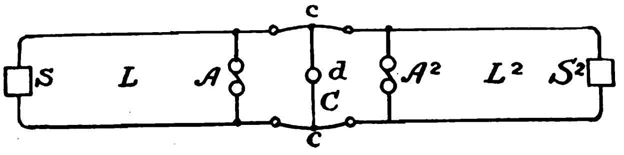


Fig 4

In this arrangement which is shown in Fig. 3, the call annunciator was connected on the answering-jack section between the two main conductors, the normal circuit through it being opened by the separation of the jack contacts when the switch-plug was inserted. The operators' telephones and clearing out annunciators were no longer connected alternatively in series in the cord conductors, but were bridged between the cord strands, controlled, however, as before, by their several keys.

The subsequent development of the telephone switchboard depended upon the outcome of three apparently parallel and independent but really coördinate and gradually convergent lines of investigation.

(*a*) The further improvement of the switchboard apparatus proper, by abolishing the serially-connected jack contacts, which as indicated. were a prolific cause of imperfect service.

(*b*) To do away, if possible, with the multitudinous transmitter batteries of the sub-station and operating room, and to substitute for them a common central source of transmitter current.

(*c*) To arrange if possible for the gradual displacement of the sub-station call generator, and the necessity for its operation in the transmission of incoming call signals; to provide that call and disconnect signals should be automatically transmitted by the simple acts of taking the receiver from the hook switch, and restoring it thereto. The main problem was clearly the elimination of the spring-jack contacts. But how? Naturally, by arranging the switch-socket contact members at each section in parallel branches from both of the main conductors of their respective lines. But here was a difficulty; the serial spring-jack contacts were not by any means purposeless. The manifestation of incoming calls involved a subscriber's circuit, closed at the central office end, and an annunciator or similar call device connected in it; and the main purpose of the separable contacts in each jack was to ensure that while the spring member of such contacts which was on the lineward side should engage the inserted plug, the same should also be lifted by the plug tip from the fixed or insulated pin contact, thus opening the circuit at that particular socket, and cutting off all that portion of the circuit inwardly; that is to say, the original terminal including all following switch-sockets, together with the annunciator. Herein lay the difficulty; for if the insertion of the plug merely made contact with two branch springs, and did not sever the main conductors, how should the original terminal and annunciator be cut off?

But if we take electro-magnets out of the main conductors, they will of course no longer oppose the passage of the voice currents, and if we then connect the magnets in bridge between the mains, we no longer need to disconnect them when we unite one line with another, because they still retain the impedance. So then the first solution came to several minds at once. Why disconnect the calling annunciator at all? Why not disregard it, and leave it connected with the line while the circuit is switched, depending upon its impedance to prevent the short-circuiting of the currents through the annunciator branches thus left intact.

Fig. 4 shows in diagram the talking circuit as thus formed between two sub-stations; the circuits of such sub-stations being switched together under these conditions. In this figure L and L^2 represent circuits extending from sub-stations S and S^2 respectively, to a central station C, and there provided with permanently connected call annunciators A and A^2. They are supposed to be united for conversation by the switch-cord conductors *c*, between which the disconnecting annunciator *d* is bridged. So connected, the line annunciators are obviously bridged also, and thus the through circuit has at the central station three bridges, each containing an electro-magnet. Here, then, arises another difficulty. The wanted station must be called by the central station operator after the switch-plug is inserted in the proper line jack; and since the annunciator of the wanted line is not cut off, it will respond unless means are taken to prevent. Moreover, since it may be and probably is at another section of the board, its operation will doubtless be regarded as a call by the operator there, who of course will try to answer the supposed call. Again, when the conversation is over, and the substations S and S^2 ring off, the line annunciators A and A^2 are again likely to respond, one of them in any event being probably at another section of the board, so that this also will be taken as an incoming call. A number of propositions looking to the avoidance of such false signals were proposed, but the most promising plan for the

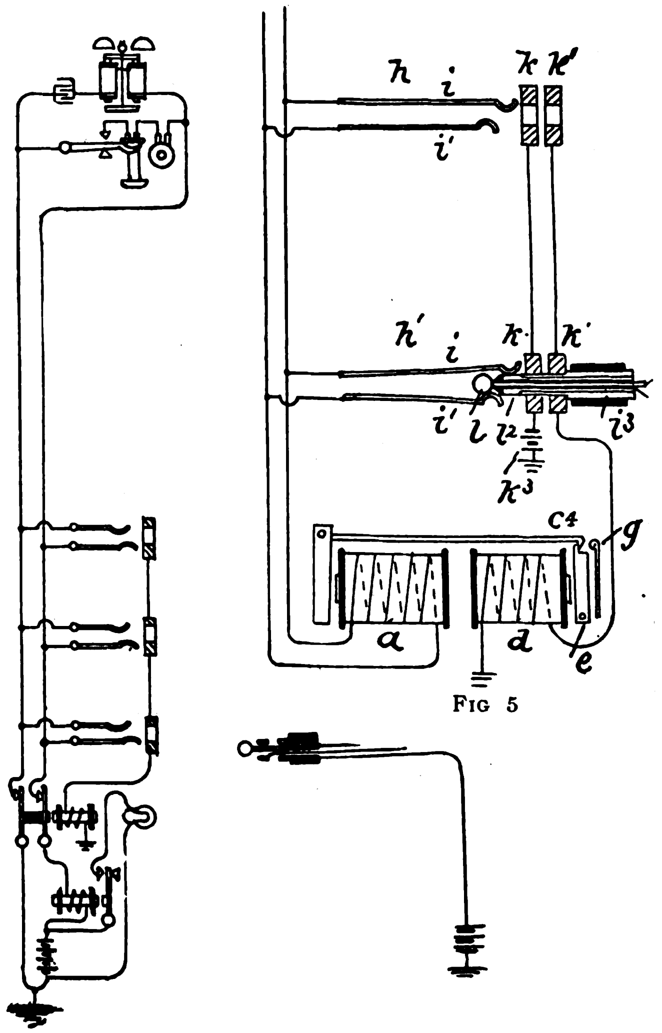


Fig 5

FIG. 6.

latter contingency was so to arrange the switch-plugs and sockets, that the insertion of the plug might close a local circuit containing an electro-magnet, which magnet would when excited by the closure of its circuit, act to hold the armature of the annunciator in its normal position so that the annunciator could not operate and display its signal, even though a current should pass through its actuating magnet. This device, which is indicated by Fig. 5, worked in fact so satisfactorily that it not only prevented the undesired operation of the annunciator, but also acted to re-set the same, when the signal had been given, pursuant to an original call; so that a drop fallen to display such signal did not need to be manually replaced, but was automatically restored as soon as a plug was inserted to answer the call.

So many adverse electrical influences were now abroad, by reason of the numerous heavy current systems which had been installed, that the "busy test" arrangement already described was no longer serviceable. Accordingly, a form of "busy test" circuit never crossed or conductively associated with the line conductors,' but altogether local was substituted. The insertion of the plug for the purpose of switching one line to another, was made to close one of two gaps in the local test circuit which was in part formed of the several test-rings of each line and the conductor uniting them; and also acted to connect a battery thereto, thus raising the potential of all the test rings of the line at all sections. The other pole of the battery was connected through the operator's telephone to the tips of all of the calling or companion plugs. Thus, when the tip of such a second plug was applied at any section to the test ring of the wanted line, the occurrence or non-occurrence of a click in the instrument, enabled one to readily infer the engaged or disengaged condition of the said wanted line. As thus modified, a number of switchboards were installed and the type of apparatus became known as the "branch terminal" switchboard.

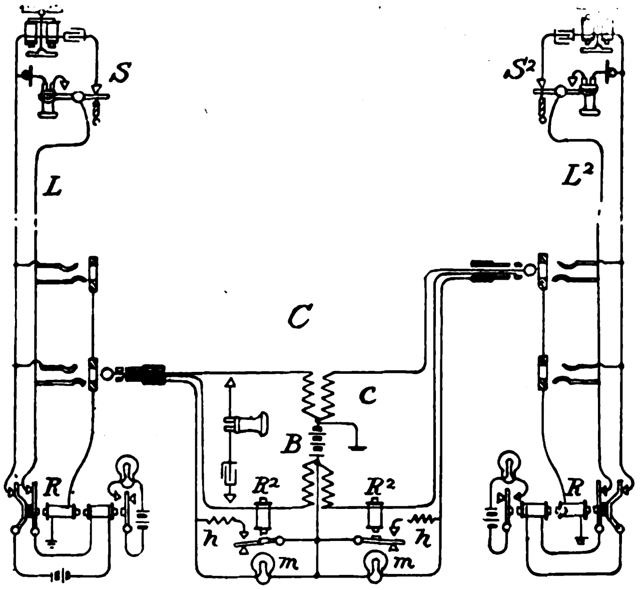


FIG. 7

After much consideration and trials, both experimental and commercial, of many plans, the "how" of an efficient central and common battery system for telephone circuits, and the central and sub-station transmitters, together with a system of incoming call signals and supervisory signals was as a whole devised and decided upon. In it, the same central office source of current may be employed for both signals and transmitters.

The sub-station circuits were then arranged to be, while at rest, conductively closed at the central station through a battery and call device, and conductively open at the sub-station; but it was necessary to provide some kind of an operative circuit for the polarized sub-station bell, as otherwise calls from the central station could not be received; and the plan which seemed most promising, and which has been generally adopted, is to place a condenser between the severed ends of the two line conductors and in series with the bell magnet. By this expedient while the circuit is open at the sub-station for a steady current, it is practically closed for the passage of the alternating ringing currents of the central station generator, to which the bell is adopted to respond. There is also the ordinary hook-switch which serves as a support for the receiving telephone when not being used; and as long as the receiver remains in place on the hook, the foregoing conditions continue; but as soon as the receiver is lifted from the hook, the matallic circuit is closed through the sub-station telephones and the current of the central battery being thus enabled to flow, causes the operation at the central station of the call signal relay.

A small glow lamp serves as the line or call signal, possessing the great merit of being prompt and self-acting both in display and withdrawal; and in practice is placed in a short local circuit controlled by the call signal relay, which has its magnet connected in the main line, and is responsive to the initial operation of the sub-station hook-switch. Fig. 6 indicates the arrangement.

The constantly connected annunciators of the branch terminal board were thus superseded by a relay and a lamp, and the appliances formerly employed to maintain the quiescence of such annunciator were now made, instead, to operate a cut-off relay by means of which the lamp-operating relay might be cut away or disconnected, and the lamp signal thereby withdrawn, as soon as the call was answered by inserting the switch-plug. This cut-off relay has two resting contacts through which the two conductors of the main circuit respectively pass, in such manner that on the excitement of the relay and the consequent attraction of its armatures, the contacts are parted and the continuation of the line, including the call relay and the normal battery connection is cut off. The cut-off relay itself is in a local switchboard circuit controlled by, and leading through contact pieces of the switch-plug and socket. The switch-socket for this purpose has interior contact springs for both main conductors, thus leaving its frame-piece or test-ring at liberty for the local circuit; and the several test rings of each line are united by a fixed conductor extending from all of them to one terminal of the cut-off relay. The plug also has three insulated contact pieces adapted to register with the two line springs and the test ring of the socket; the cord conductor extending between each pair of plugs comprising two main line strands which extend from plug to plug, and a local circuit strand for each plug. A battery has one of its poles connected with the plug local circuit conductor and the other to the remaining relay terminal, so that when the plug is placed in the socket of any line, the cut-off relay circuit is closed, and the relay operates to disconnect the line terminal and relay. At the same time the potential of all of the united test rings of the line thus switched is raised to furnish appropriate conditions for the "busy test."

But this is not all. Supervisory signals are regarded as being necessary. These, also, are lamps, and two such are provided for each switch-cord, and associated with the two plugs respectively, being placed in the cord section of the local or cut-off relay circuit. Thus placed, they are, of course, non-operative except when the plug is in its socket; but the plug being thus inserted, their function is to afford an indication to the operator of the condition of things at the sub-station. They can only be displayed when the hook-switch at the sub-station is in its lower or normal position; that is to say, the position in which it is maintained while the receiver hangs on the hook. When in answer to a call the operator inserts the answering plug in the socket of a given line, the associated lamp does not light, because the sub-station receiver has already been taken from the switch to give the order. But when the companion plug is placed in the socket of the wanted line, the lamp signal of that plug does light, because the receiver at the wanted sub-station is not removed from the hook; it thus follows that when this receiver is taken up in response to the call, the light is at once withdrawn. Again, when the conversation is over, the replacement of either or both sub-station receivers will once more illuminate the corresponding lamps to serve as a disconnecting signal. Or if either party desire at once a connection with some other line, the lamps may be made to flash several times in succession, by oscillating the hook switch.

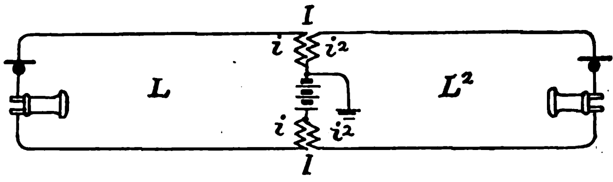


FIG. 8.

To enable the hook switch to control the signal, a low resistance relay is placed in the main circuit conductors of each plug, which relay being thus connected in the main line, is responsive to the closing and opening thereof as the hook switch is moved in one direction or the other.

The sketch Fig. 7 illustrates this arrangement, and shows that the relay in question does not act directly upon the local circuit of the lamp to open and close the same. This cannot be allowed because the same local circuit serves also for the operation of the cut-off relay and "busy test." It acts, however, by controlling a shunt round the lamp signal, closing the said shunt and preventing the display of the light when the main circuit is closed, and current consequently flows through the relay; and opening the shunt to permit the display of the lighted lamp when the receiver at the sub-station is replaced, causing the hook switch to open the main circuit so that current to excite the relay no longer flows.

In the figure, L L^2 are the sub-station circuits extending between the sub-stations S S^2 and the central station C, and adapted to be switched together for conversation at the latter. The switch-cord *c* has the battery B bridged between its main conductors, and has local circuit conductors for each plug, forming in association with the fixed conductor which unites the test rings, the local circuit; R R are the cut-off relays, R^2 R^2 the supervisory relays, *m m* the supervisory lamp signals and *h h* their controlling shunts.

The battery which develops the current for the main line to excite the relay, is, as shown, preferably bridged between the two main circuit cord conductors, which respectively unite the tip and forward sleeve contacts of the two plugs, and so connected, divides the cord circuit into two well-defined sections looping from each plug. The same battery provided with an earth connection at one pole, may serve also to furnish current in the local circuit to illuminate the lamp signal, and indeed also for the operation of the cut-off relay and busy test appliances; the several circuits being properly proportioned to the battery power and to one another by suitable resistances.

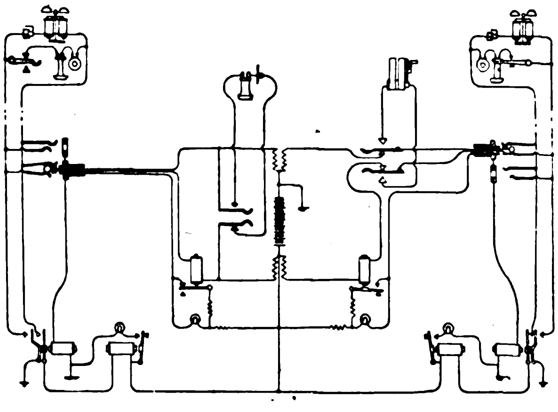


FIG. 9

Another improvement tending to increased promptness of service in responding both to "call" and "disconnect" signals, is the "pilot lamp." This is an auxiliary luminous signal which may be advantageously associated with both of the foregoing classes of regular signal. It complements the regular signals much in the same way that a bell in a hotel or domestic annunciator system is made common to and complementary to the several individual drops. This plot lamp is thus common to the signals of a group of call signals, or to a group of the supervisory switch-cord signals, and it is adapted to light whenever any of the regular signals with which it is associated is displayed. It may be placed in a conspicuous position on the front of the switchboard, so as to be readily seen by the monitor or chief operator, and its protracted display is an indication that some signal of the group to which it belongs is being neglected or disregarded; or at any rate, that some signal of such group, thus far has not been attended to. It is by reason of this function that the term "pilot lamp" has colloquially been applied to the device; although I do not say that the term is eminently appropriate. The pilot lamp like the others is connected in a local circuit and controlled by a relay, which may conveniently be placed in the circuit of the main conductor through which current is supplied to the branch lamp circuits of the group. This can readily be arranged in several ways without producing such an undue drop of potential in the branch lamp circuits as will adversely affect the regular lamp signals.

When the battery is bridged as has been described, it is properly connected for use also as the source of transmitter supply. An important condition of success in the employment of a single battery for a large number of transmitters, is that its internal resistance shall be so low relatively to that of the circuits supplied, that the operation of any transmitter will not cause any material variation of potential at the battery terminals.

But another condition equally essential in the operation of the sub-station transmitters of an exchange from a common battery, is that by means of the switchboard devices and in their normal operation, it shall be possible at any time to disestablish this universal state of reciprocal neutrality or non-interference as regards any two circuits.

One plan of operation meeting this condition, which to a certain extent has been used, is to introduce a considerable impedance into the conductors connecting the main circuit strands of the switch-cord and thereby the main conductors of the two circuits concerned, with the pole or poles of the battery; and to establish a short-circuit, preferably containing a condenser, between the corresponding conductors of the two component circuits, and round the impedance.

Fig. 8, however, illustrates an alternative plan which thus far has found more general acceptance. It consists in associating the two united sub-station circuits L L^2 and the common battery B bridged at the central station between their main conductors, with an induction coil I of the type often styled repeating coils, wherein the two windings *i* i^2 have a like number of turns and like resistances. Each component circuit is thus supplied separately with battery current from the transmitter of its sub-station through its own winding of the induction coil; and each is alternately the transmitting and receiving circuit. This arrangement well complies with the second condition of success. It divides the circuit up into two sections, having no conductive connection, and thus tends to minimize the possible effect of a fault which may exist in either; and it reduces the adverse effects which otherwise would be very noticeable when the two lines connected differ considerably in length.

In Fig. 9 is illustrated the application of this plan for central and common transmitter battery operation to the switchboard apparatus; and furthermore, represents in diagram the sub-station and switchboard connections of two circuits, showing how the same central source of current may be employed in connection with call signals, circuit control and speech transmission.

I may in conclusion briefly advert to a minor improvement which in some installations has been added with a view to further relieving the operator of the time-consuming duty of following up sub-operations. This is a device combined with the ringing key, which acts after the key has been manipulated, to lock it in the ringing position with the call generator connected to line for a definite and supposedly sufficient period of time, or until the attendant at the station called, responds by taking the receiver from the hook. One way of arranging such a device is to provide a spring latch which, when the key is depressed engages a shoulder on the key spindle; to mount the spring upon an armature; and to associate with each key an electro-magnet to act upon this armature, the same being wound with but few turns of coarse wire, and connected in the key branch of the generator circuit. The key having been pressed, is thus held in operation, because the current of the generator through the circuit (which, before the removal of the receiver from the hook at the sub-station is, as we have seen, kept conductively open by the inclusion therein of a condenser), does not excite the releasing magnets. But as soon as the call is responded to by the removal of the receiver from the hook, the circuit is conductively closed; and the generator current now steady and strong, is sufficient to excite the magnet, which attracting the armature, acts to release the key; so that the call current over the line is cut off.

WORKED THE WRONG WAY

THE report of an explosion in the safe of the Warren Bank, at Warren, Mich., recently, awakened Postmaster Osborne. He telephoned a neighbor that robbers were at work on either the bank or post-office. As all the telephones are connected after night, it is supposed that the burglars heard the bell ring and listened to the conversation. Anyway, when Osborne started down the street he was shot in the face with a charge of buckshot, killing him instantly. The citizens are now questioning seriously the advisability of having all the telephones connected after dark.

FOREIGN CURRENTS

By "The Arrester."

THE sale of the Tunbridge Wells municipal telephone system to the National Telephone Company, after an active existence of some 18 months only, while it has apparently caused the British Town Councils to scrutinize telephone matters a little more closely than before, has by no means served as the effective damper on municipal telephony which it was designed to become. Both the Brighton and the Swansea corporations are proceeding with the installation of the systems designed for them by the same consulting engineer who made the original estimates for the Tunbridge Wells system. The details of the Brighton scheme have just been published in the electric journals, giving the names of the various firms who have tendered for the different portions of the system. .Several other municipalities are agitating the question of establishing telephone systems, and while the cause of competitive telephony in England is not exactly where it was before the Tunbridge Wells incident, it is still by no means extinguished. In spite of the capital that has been made out of the failure of the Tunbridge Wells corporation to persevere in its telephone enterprise there are several plain facts that stand out and are by no means discouraging to the supporters of municipal telephone enterprises.

* * *

The chief points in the discussion that are made by the opponents of the monopoly is that by reason of the competition of the municipality the number of telephones in use in the Tunbridge Wells area was increased from about a hundred to some sixteen hundred and that the rate for telephone service was reduced from a minimum of $40 to a maximum of $30. Having brought about these results the municipality has sold out its system for the full amount of cash expended on capital account. In fact the detailed accounts of the transaction go to show that the National Telephone Company, in taking over the system, actually incurs a liability of $140,000 whereas the cash raised by the Tunbridge Wells telephone loan was only $125,000, the loan apparently having been issued at a discount of twelve per cent. The National Company, therefore, was willing to pay a premium of $15,000 over and above the gross cost of the system in order to acquire the undertaking of its competitor. The benefits secured by the greatly extended development of the telephone and by the reductions in-rates, due entirely to the establishment of the Tunbridge Wells municipal system, will be permanent and having secured these benefits to the community the municipality retires from the contest without the loss of a cent. Therefore, argue the supporters of municipal telephony, the outcome of the competition is by no means to be considered a victory for the National Telephone Company.

* * *

To a certain extent this argument is a good one, but if it be followed out to its legitimate conclusion it is by no means sound or business-like. To begin with, it assumes that the purchase of the Tunbridge Wells system by the National Telephone Company was purely a matter of policy, intended to provide the company with a bogey with which to frighten off competition. This assumption is fairly well justified, both by the general practice of managers of large businesses and by the actual history of this particular case. On no other assumption, in fact, could the willingness of the National Company to pay full cash price for a plant acknowledged to be worth much less than had been spent on it, and a handsome premium to boot, be explained. But obviously the National Telephone Company could not afford to do the same thing in many places. If it continued to buy up competing systems at extravagant prices and at the same time bound itself, as it has at Tunbridge Wells, to supply service at greatly reduced rates it would soon be doing business at a loss. Naturally it is not going to continue that policy. But the argument which regards the Tunbridge Wells sale as a victory for municipal telephony assumes that it would, and that a municipality having established a telephone business would be able, as soon as things began to look doubtful, to sell out without loss.

* * *

There does not seem to be very sound encouragement for municipal telephone competition along these lines. If the Tunbridge Wells system could have been shown to be a decided commercial success there would be something in the argument, for then it might be said that the municipalities would be in the strong position of being able to carry on their telephone systems at a profit or at any time that they might choose to sell out to the National Telephone Company. But from all the figures and details that have been published the reverse seems clearly to have been the case. The system cost more to establish than it was expected to cost, it cost more to operate than it was expected to cost and it brought in less revenue than it was expected to bring in. This brings the whole argument to the ground, for while it may very well have paid the National Telephone Company to buy as a bogey the derelict Tunbridge Wells system before it could be reorganized, that concern is probably quite astute enough to see that bogeys are expensive luxuries and that municipal telephone systems carried out on the lines followed at Tunbridge Wells are not likely to be dangerous competitors in the long run.

* * *

If the British municipalities expect to accomplish permanently useful results by embarking in the telephone business, the lessons they will draw from the Tunbridge Wells incident will be very different from those indicated by the argument discussed above. It is pretty clear that the Tunbridge Wells system was quite legitimately in difficulties apart altogether from the intervention of the National Telephone Company, and those difficulties had come about from the whole business having been projected and conducted upon too narrow lines. No provision had been made for the development that automatically occurs when very low rates are adopted and no allowance for the large margin for development that must always be provided in an expanding telephone plant. As one of the English electrical papers says: "It is undeniable that an enterprising municipality has found a public telephone service to be a much more arduous business than it had calculated without practical experience." Tunbridge Wells has bought its practical experience very cheaply and the results have been widely published for the general benefit. However much the contending parties may squabble over the figures, the fundamental errors are quite evident and it is by these rather than by unessential details, or by ingenious arguments that endeavor to convert an isolated example into a general policy, that others interested in competitive telephony should be guided.

* * *

That there is ample opportunity for telephone competition in England has been fairly well demonstrated, but to endure, the municipal systems must be laid out in a broader-minded and more enterprising manner than they have been so far. To rely upon being bought out by the monopoly if things do not pan out well after a year or two is equivalent to a confession of weakness from the start. The telephone business, if properly projected and managed, is quite capable of standing on its own bottom, but it is severely handicapped if modern ideas are not adopted and if the broadest views as to the possibilities of the telephone are not held by those responsible for the general control of the enterprise. So far, however, there are no signs of a real telephonic awakening in Great Britain or of a true understanding of the telephone business as it is understood today in this county. The Brighton scheme, for example, of which mention was made at the beginning of these notes, is laid out for a system of 1,000 subscribers and is estimated to cost a trifle short of $100,000. The Tunbridge Wells case was thoroughly discussed by the Brighton Town Council and it was pointed out that whereas the Tunbridge Wells area was 180 square miles, in which there was a population of only 70,000, Brighton had a population of 200,000 in an area of only 120 square miles. And yet, with a population of 200,000, Brighton is complacently providing a telephone system designed to accommodate just one thousand subscribers!

The Operating Field

AGGRESSIVE POLICY OF SOUTHERN INDEPENDENTS

OVER $350,000 is to be expended this year in constructing long-distance telephone lines by the Memphis Telephone Company and the Memphis Long Distance Telephone Company, of Memphis, Tenn. C. E. Stinson, late manager of the Rochester, N. Y., Independent Telephone Company, has been elected president of the Memphis Telephone Company. Mr. Stinson is thoroughly experienced in the telephone business, and will devote his best energies to the extension of the system of the company.

Long distance lines from Memphis over the entire territory tributary to Memphis, New Orleans on the south, St. Louis on the north, Little Rock and Springfield on the west and a connection with Louisville and Nashville are the objective points of the far-reaching plan which will be carried out.

At a meeting of the stockholders and board of directors of the Memphis Telephone Company, recently, Harvey Myers, who has been president of the company since its organization, tendered his resignation, which was accepted, and, on motion, Mr. Stinson was elected to fill the vacancy.

Mr. Myers was elected chairman of the board of directors and will continue in touch with the company. No other changes were made in the officers of the company.

In a personal interview recently Mr. Myers was reluctant to discuss the contemplated extensions of the company for business reasons. However, he said that the Memphis Long Distance Telephone Company had already started to build a line to run 150 miles to the southeast from Memphis and would project other lines north, west, south and east. It is allying itself with various Independent local companies in Tennessee, Mississippi, Arkansas, Texas and Kentucky, and is purchasing right of way to extend to these lines for connection. A Yazoo City company is now within eighty miles of New Orleans and is an ally of the Memphis company. Mr. Myers said that the Memphis Telephone Company would make vast improvements this year.

BEFORE AND AFTER COMPETITION

MUSKINGUM County, Ohio, had a total of 766 telephone users a year ago. They were all served by the Bell licensee in that section of the country. Of this number, the city of Zanesville, had 700, the town of Dresden 31 and the town of Roseville, 35.

To-day, subscribers of the Zanesville Telephone and Telegraph Company, the Independent Company started about a year ago in Zanesville, can reach in Muskingum county a total of 1,635 other subscribers. These subscribers are in the following cities: Zanesville, 1,200; Roseville, 100; Dresden, 95; Rix Mills, 100; Frazeysburg, 50; New Concord, 90.

Lines diverge in every direction from Zanesville, connecting nearly 400 farmers with the Independent system. About 200 of these are connected with the Zanesville exchange and have free service with the city subscribers. This free limit extends in all directions from Zanesville a distance of from 8 to 16 miles, and is proving a great advantage to subscribers both in the city and country.

Before the organization of the Independent Company not one farmer in the county had a telephone, neither was he able to get it, for the reason that the Bell Company refused to furnish service to that class of patrons. Petitions from the public for toll stations at various points along the company's lines in the county were met by demands that the people must subscribe from $50 to $100 before such stations would be established. Since competition was directed to those points, the monopoly has voluntarily opened stations without asking any bonus whatever.

The Bell Company alleges that it has 2,300 subscribers including kitchen and party line service. Its last directory, distributed in August, 1900, shows about 1,400 including many duplicates. But admitting that the Bell has 2,300 subscribers for the sake of argument, persons having both telephones can reach 3,935 subscribers in the county as against 766 before competition entered the field. They can also reach 29 toll stations in the county over the Independent system alone.

Subscribers to the Independent system can communicate with more than double the number of telephone users in the county than they could reach over the Bell lines before the advent of Indpendent telephony. The fact that at that time the Bell company charged $48 per year for a business telephone and $36 per year for a residence telephone on exclusive circuits, while the Independent company charges $33 per year for the former, and $18 for the latter proves that patrons can already get from the Independent company alone more than double the service at little more than one-half the price that was formerly charged by the Bell company. The class of service, needless to say, has also been very much improved.

INDEPENDENTS IN TEXAS

TEXAS, the largest State in the Union, is being developed to a large extent by Independents. At present, there are several large companies in operation there, and a number of others which are constructing systems. Nearly every week, one or more new companies are chartered in the State for the purpose of constructing and operating lines or exchanges.

The Tyler Telephone Company has completed its system in Tyler, Texas, and is in first class operating condition. It has 600 telephones in operation, which is double the number operated by the Bell in Tyler. This company does a local business only. Its switchboard is the American full multiple central energy.

The Globe Telephone Company is building toll and long distance lines from Tyler to all sections of the State. It now has the first 22 miles of lines completed, and many more under way. The Globe Company will ultimately connect with all the lines of the Commercial Telephone Company. This latter company is the leading Independent toll and long distance company in Texas.

S. F. Richardson is president of the Globe Company; Z. T. Harris is treasurer, and E. D. Johnston is secretary. Mr. Johnston is also assistant manager of the Tyler Telephone Company.

WOOD COUNTY COMPANY PROSPEROUS

A. L. FONTAINE, president of the Wood County Telephone Company, Grand Rapids, Mich., read the following report of the company's affairs at a recent meeting of the stockholders:

"The growth of this company continues unabated and almost without a parallel. During the past year, our manager informed me, we have installed 82 telephones, the largest number of any one year in our history.

"At the close of 1900 we had 129 business telephones, 193 residence telephones, 40 in Nekoosa and 10 on the marsh line. This year we have 150 business telephones, a gain of 21; 208 residence telephones, a gain of 15; 50 in Nekoosa exchange, a gain of 10 telephones; and 11 on the marsh line, a gain of 1; a grand total of 419 telephones.

"The total value of our exchange at the close of 1901 was $19,367.50; this year your board of directors have deemed it wise and expedient to take off 10 per cent. of the value of the plant for depreciation—therefore the actual cash value of our plant to-day is $20,223.76.

"We have sold during the year 1902 40 shares of stock at $50 per share, amounting to $2,000; and redeemed during the same period, 20 shares of stock at $50 per share, amounting to $1,000, leaving a net gain from sale of stock of $1,000, this being $650 less than the amount we received last year on the sale of stock. Our receipts from telephone rentals, monthly, have been $436.07, amounting to $4,844.09 for the year 1902, and we have paid out for office operating expenses, $258.13 monthly; amounting in all to $3,097.59 annually, showing a difference, or gain, of $177.84 per month, or $1,746.50 per year."

The switchboard of the Wood County Company is now filled to its ultimate capacity and the directors are expected to make preparations for enlarging it in the near future. Another trunk line connecting the exchanges in Grand Rapids and Nekoosa is also imperative.

The officers of the company are: A. L. Fontaine, president; H. E. Herrick, vice-president; G. W. Paulus, secretary; Charles Briere, treasurer, and E. C. Starks, general manager. The directors are: John Schnable, Charles Briere, George W. Paulus, H. E. Herrick and A. L. Fontaine.

ATLANTA INDEPENDENT COMPANY TO BE SOLD

The bondholders of the Atlanta Standard Telephone Company have decided to sell the property of the company at public auction under foreclosure, in order to reorganize its affairs. The sale will take place Thursday, Feb. 5, at noon, at the courthouse in Atlanta, Ga.

The Atlanta Standard Company now has 2,300 subscribers, and with the exception of the switchboard and instruments, the plant is first class in every respect.

There are over 42,231 feet of underground conduit, with about 107,071 feet of wires and cables therein. The aerial plant comprises about 73,368 feet of cables and 410 miles of wire.

In writing to The American Telephone Journal about the sale, Mr. F. L. Turner, general manager of the company, says:

"This proposition offers the best opportunities I know of in the telephone field, Atlanta being the representative city of the South, and capable of supporting at least 8,000 telephones.

"The upset price of $200,000 (which has been fixed) is about one-third of the actual value of the plant. The conduit system and the line construction is of the highest possible type. The underground cables are in excellent condition, with a capacity of .08.

"The company has the utmost support from the public, and with sufficient switchboard capacity and new instruments, could install from 5,000 to 7,000 telephones within the next nine to twelve months without any difficulty.

"The majority of bondholders decided with the Trust Company, that in order to clean matters up and get on a good sound footing, it would be better to foreclose and sell.

"The service given is much superior to that of the Bell, but at present we have not the additional capacity necessary to make an increase."

UNIQUE METHOD FOR IMPROVING OPERATING

The Fayette Home Telephone Company, of Lexington, Kentucky, recently carried through a scheme for determining that its service is satisfactory to the patrons, that is certainly novel, and to be highly commended. Mr. J. K. Johnston, the manager, sent out a printed card to all the subscribers on which were questions as to the service, etc.

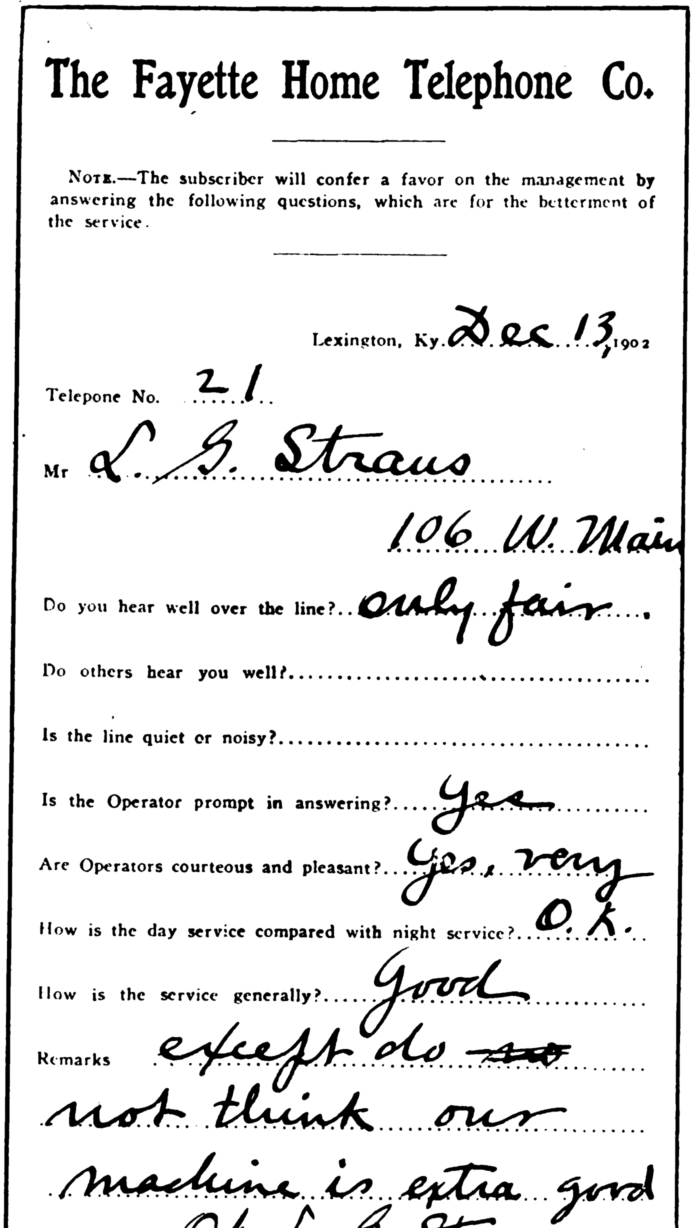
About 750 of these cards were circulated, out of which number only 23 or 24 were returned with complaints. Whenever a complaint was made, the company promptly proceeded with a remedy and had the complainant "O. K." the card.

One of the cards is here reproduced as it was returned by a subscriber. The subscriber, as the card shows, was not satisfied with his instrument. The company immediately sent out an inspector who repaired the instrument to the satisfaction of the patron. The latter then affixed his O. K. to the bottom of the card as shown.

For testing the efficiency of the operators Mr. Johnston recently inaugurated the following plan.

Each operator was given ten test calls every two weeks. The one making the best record was given a day off with pay. The day operator having the best final record, was offered a prize of $10 in gold; the day operator having the second best record, a prize of $5; the relief operator having the best record, $5, and the night operator having the best record, $5.

The operator who won the first prize for day operators, answered 80 test calls in 199⅞ seconds. The second prize operator answered 80 test calls in 200¾ seconds. The best relief operator answered 80 calls in 208 seconds and the best night operator answered 80 calls in 265 seconds.



The Fayette Home Telephone Co.

Note.—The subscriber will confer a favor on the management by answering the following questions, which are for the betterment of the service.

Lexington, Ky. Dec 13, 1902

Telepone No. 21

Mr L. G. Straus

106 W. Main

Do you hear well over the line? only fair

Do others hear you well?

Is the line quiet or noisy?

Is the Operator prompt in answering? Yes

Are Operators courteous and pleasant? Yes, very

How is the day service compared with night service? O. K.

How is the service generally? Good

Remarks except do ~~so~~ not think our machine is extra good

Ok L. G. Straus 12/20 '02.

The tests were conducted by inserting a plug on the terminal in the cross-connecting room, to which was attached a telephone. The time from the removal of the receiver until the operator answered was taken with a stop watch. The operators did not know when or on what lines the tests would be made, this making the tests fair to all.

Marked improvement was noted in the records made, one young lady answering the first ten calls in 40½ second and the last ten calls in 16½ seconds.

OPINION AND COMMENT

THE BELL COMPANY ADMITS DEFEAT

THAT the American Bell Company has finally made up its mind to an absolute surrender in the Berliner matter, is clearly shown by an incident that has probably escaped the attention of most men in the Independent telephone field. For years, the Bell Company has carried an advertisement in all the technical papers that would accept the matter, announcing its ownership of the Berliner patent and declaring that this patent covered "all forms of microphone transmitters or contact telephones."

The object of this advertisement was clear enough, as THE AMERICAN TELEPHONE JOURNAL has pointed out before. It was intended to intimidate capitalists who might be approached with a proposition for Independent telephone investment. It was also relied on to keep ambitious producers of electrical apparatus out of the telephone field. How much effect this advertisement has had no one can tell. In conjunction with the Berliner litigation, which was purposely drawn out as much as possible, it no doubt had its influence in retarding, to some extent, Independent development, at least in the earlier stages.

Fortunately for the industry, there were plenty of men with brains and money, who refused to be influenced by the Berliner bugaboo and, thanks to these men, the industry was forced ahead at a rate that has never been equalled in any other line of work.

When the decision of the United States Circuit Court of Appeals, at Boston, was handed down the other day, there were some people foolish enough to suppose that the Bell Company squarely beaten on the issue, would concede victory to the other side. But that was evidently too much to expect. President Fish of the Bell Company, instead of coming out openly and admitting that the Berliner patent litigation was dead, gave out an official statement that the case "might" be carried to the United States Supreme Court, though the question had not yet been passed upon. Mr. Fish is a lawyer, and a lawyer of great ability. No one knew better than he that there was no warrant for this statement, that under the practice of the Supreme Court the case could not be carried up any higher because there was no great principle of law or equity involved in an appeal.

From the moment that the decision was handed down at Boston, every lawyer who understood his business, and Mr. Fish understands his thoroughly, knew that the case was dead. Nevertheless, he could not resist giving out the impression that this decision was only another step in the long litigation, and that further proceedings might follow that would keep the Berliner question alive to harass the Independents. His statement was telegraphed all over the country and reproduced in most of the daily newspapers.

That the company was very sure of its position, that it knew it had been defeated once for all, that it knew the Berliner patent to be as dead as a door nail, so far as any controlling influence on commercial telephony was concerned, was made manifest by the incident spoken of. In all the technical papers that carry the Bell advertisement it came out last week in a changed form.

The vital section in which the Bell Company announced its ownership of the Berliner patent and its claim that it covered "all forms of microphone transmitters or contact telephones," was dropped. Instead the space owned and paid for by the company was taken up by a mere business card set in large type. It read:

THE
AMERICAN
BELL TELEPHONE
COMPANY,
125 MILK ST., BOSTON, MASS.

This advertisement makes a very pretty epitaph on the gravestone that marks the final resting place of the Berliner patent. If, at any time, the ghost should be paraded, as it may be by the Bell people in communities where the facts are not known, all that is necessary is to point to this epitaph and the ghost will be laid.

The Berliner litigation is over for all time, and one of the most troublesome factors with which the Independent pioneers have had to contend has been overcome. The thanks of all men engaged in the industry are due to these fearless pioneers, to the men who were not afraid to come to the front and fight the greatest and most harmful monopoly America has ever seen. This fact should not be forgotten.

WIRELESSNESS

HISTORY repeats itself. A quarter of a century ago the vested gas interests were threatened with annihilation because Mr. Edison had invented the carbon filament and sub-divided the electric light. But to-day there is no better investment than a good gas stock, despite the millions of glow lamps which burn everywhere. The daily papers are now teeming with flaming advertisements of wireless telegraph companies, and stenographic interviews with distinguished scientists, who are reported as predicting the abolition of all of the telegraph companies, and the relegation of the modern telephone exchange to the scrap heap, before the triumphal march of the Hertzian wave. Many of these articles appear to be, in newspaper parlance, "mere bids for space." Others are more veracious and perhaps "make good copy," at least from the sensational standpoint, but what are the real facts in the case? To Mr. Marconi certainly belongs the credit of a long and patient effort, which has resulted in the transmission of intelligible signals across the ocean, a monumental and epoch-making achievement. But there is a practical side to even the most astonishing scientific success. Various inventors have been experimenting with wireless signaling for several years, but where are the commercial returns? Is there a single wireless company that has paid a dividend? What are the stockholders of even Mr. Marconi's own company getting? Where are there any wireless telegraph installations that can be regarded further than in the light of interesting scientific experiments. And as for wireless telephony, beyond certain laboratory experiments with the speaking arc and selenium cells, it is not even in an experimental stage.

There are certain apparently almost insuperable difficulties with wireless signals. In the ordinary method of telephoning and telegraphing, a wire forms a path or guide along which the electric energy travels to reach the desired correspondent, accomplishing its purpose with little loss and no surrounding interference, but with wireless signaling quite the contrary conditions obtain. Suppose a man at the top of a high building wished to speak to another in the basement, he could lean out of the window and shout, and if ten men wished to do the same thing simultaneously the resulting confusion is better imagined than described. Contrariwise, if each man went to a speaking tube and whispered his message, all would be transmitted with no confusion and little expenditure of energy. Wireless signaling resembles the man who attempts to scream. Each message requires the expenditure of sufficient energy to affect a sphere of space whose diameter is twice the distance between the transmitter and the receiver, and as yet all instruments within this sphere are equally affected, so that at present it is impossible to prevent the utmost confusion unless wireless signaling is limited to single correspondents. What the future may develop it is impossible to predict, but so far as can now be ascertained, Hertzian waves are not likely to interfere with existing telephone interests, and we advise the owners of telephone securities to button up their pockets tightly and hold on to their bonds for a long time to come.

ELECTRICAL MEASUREMENTS—ARTICLE II.

By Arthur Vaughan Abbott.

To measure electricity, we must, as has been indicated in the preceding paper, published January 17th, agree on some electrical units as standards of measurement. Suppose we take an ordinary gravity battery and join its poles by a piece of No. 30 copper wire about ten feet long. As soon as the wire is actually connected, it acquires new properties and is said to be the seat of an electric current. There are three particularly notable effects. First, the wire becomes perceptibly warm; second, if the wire be placed near a compass needle, the needle will be deflected.

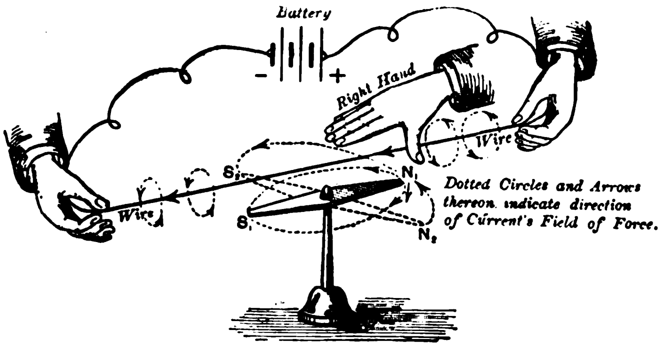

Battery
-
+
Right Hand
Wire
Wire
S_1
N_1
S_2
N_2
Dotted Circles and Arrows thereon indicate direction of Current's Field of Force.

FIG 1.

This is represented in Fig. 1, in which a compass needle is shown supported upon a standard and the wire held over the top of the needle. Under these circumstances, the needle will be deflected and take up the position shown by the dotted lines—N^2 and S^2—the north end of the needle moving away from the part of the wire attached to the positive pole of the battery; third, if a dish, containing the solution of metallic substances, such as silver or copper, be interposed in the path of the current, the metal is deposited as in the very familiar process of electro-plating. While, therefore, electricity is imponderable and illusive, *the effects* which it produces are very plain and simple.

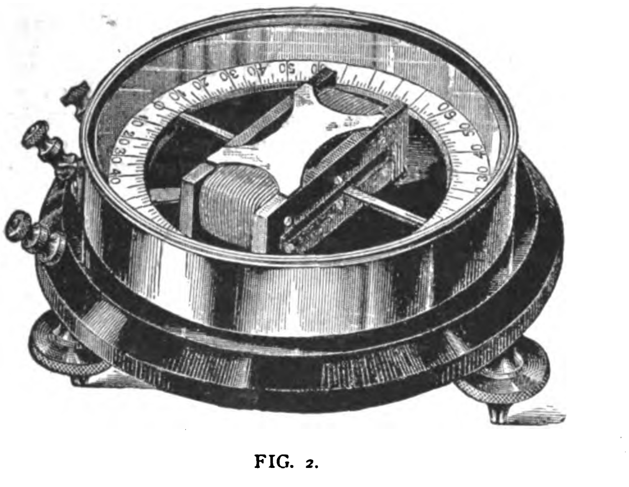


FIG. 2.

Electricity may be measured by either one of the effects just described. The most convenient method is that involving the use of the magnetic needle. Suppose the needle, shown in Fig. 1, to be provided with a long pointer, so arranged as to move over a scale of degrees; it is evident that the amount that the needle moves can be very readily and quite accurately estimated. Also suppose that the wire, instead of passing once over the needle, be wound round and round it in the shape of a coil. If one wire affects the needle, a coil will multiply this effect and increase the amount which the needle is deflected. A magnetic needle, so arranged, is illustrated in Fig. 2, in which the pointer, moving over a graduating arc, is readily discerned, surrounded by a coil of wire, the whole being protected by a glass case to keep it free from dust and unaffected by strong currents of air. Such an apparatus is called a *galvanometer,* and the deflections produced by joining the wire to the poles of a battery are easily and exactly read. Suppose the deflection of the needle to be five degrees when the ten feet of No. 30 wire, previously described, was used to join the battery poles. If now we cut the wire in half and use but five feet, the deflection will be about ten degrees, or double its original value. And, again, if the wire be cut in two, the deflection will rise to twenty degrees, so the first principle established is that the electrical effect upon the needle is inversely proportioned to the length of the conducting wire, joining the poles of the battery

The diameter of No. 30 wire is 10 mils (ten one-thousandths of an inch). Now suppose we substitute ten feet of No. 24 wire, which is twenty mils in diameter, or has four times the area that the No. 30 wire has, a deflection of twenty degrees is at once obtained, and again we see that electricity is behaving exactly as water or any other fluid, for a pipe, twice the diameter, or four times the area, will carry four times the quantity of fluid. Lastly, suppose we substitute a piece of No. 30 *iron* wire, ten feet long, for the No. 30 copper. The size and length of this last conductor are exactly the same as those of the first one, but instead of obtaining a deflection of five degrees, we shall find only about six-tenths of one degree. This experiment is parallel with the use of a smooth and rough pipe, leading from the water tank. To electricity the copper seems much smoother than the iron, or in other words, offers much less opposition to the transfer of electrical energy. These simple experiments, which any one can easily verify, teach the following fundamental principles:

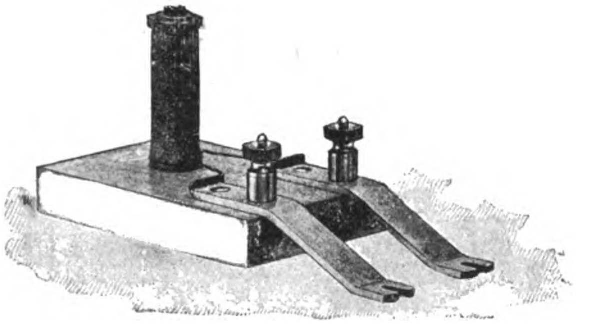


FIG. 3.

First, every electrical circuit offers a decided definite and easily measurable opposition to the movement of electricity. This opposition is called *resistance.*

The amount of resistance of any circuit depends upon three things:

A—The resistance is directly proportioned to the length of the circuit.

B—It is inversely proportional to the cross section or area of the conductor forming the circuit.

C—It varies with different substances in a manner to remind one of friction, and as, in the case of pipe friction, the only means of ascertaining the amount for different substances, is to experiment with each one for itself, for there is no known means of calculating resistance a priori.

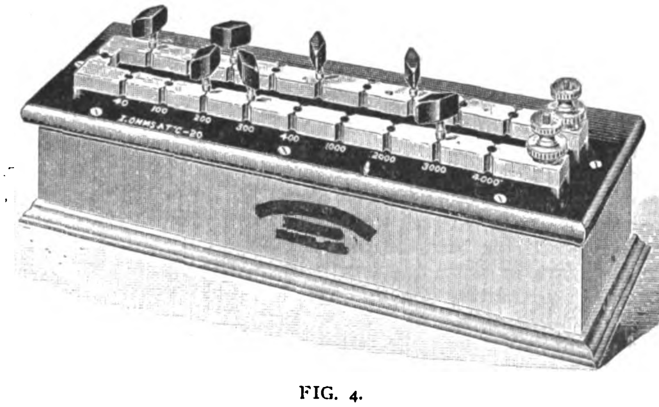


FIG. 4.

The unit of resistance is called *"ohm,"* in memory of Dr. G. S. Ohm, director of the Polytechnic University of Nurem-

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Editor's Note.—The first article of this series appeared in the issue of January 17. They will continue regularly.

berg, and the discoverer of the famous Ohm's law, to be explained later. In order to correlate electrical units with the metric system, it was decided to make the ohm, or unit of resistance, equal to that of a column of pure mercury, one square millimeter in section and one meter long. Such a unit is, of course, inconvenient to use, and for all ordinary work coils of wire are prepared, that are carefully compared with a standard and adjusted within any desirable range of accuracy. Such coils are usually tèrmed "resistance boxes," and can be obtained in stock at any of the makers of electrical apparatus. The simplest form is that shown in Fig. 3, which consists of a spool of carefully insulated wire, mounted on an insulating block, the ends of the coil being connected to two heavy binding posts or copper terminals. Such standards, of any desired value, from half an ohm to a thousand ohms, with an accuracy of one-tenth of one per cent., cost from five to eight dollars each. To the electrician, such a coil plays the same part as a foot-rule to a carpenter. Suppose we desire to ascertain the resistance of an unknown piece of wire. We connect the battery, galvanometer and compass needle in series and note the deflection produced. We then substitute the standard coil for the unknown wire and again note the deflection. Suppose the resistance of the standard coil to be two ohms, and the deflection ten degrees. Suppose when the unknown wire is substituted the deflection is five degrees, we then have the following proportion:

$$5:10::2:X \text{ — solving, } X = 4,$$

or, in other words, the resistance of the unknown piece of wire is four ohms, or twice the resistance of the standard. To express this principle in more general terms—suppose the resistance of the standard to be r-ohms and the deflection when it is in circuit d-degrees and the deflection with the unknown wire to be d′-degrees, we then have the proportion $d':d::r:x$, or $x = \frac{dr}{d'}$, or the unknown resistance is equal to the known resistance multiplied by the deflection produced when it is in circuit, divided by the deflection produced when the unknown resistance is in circuit.

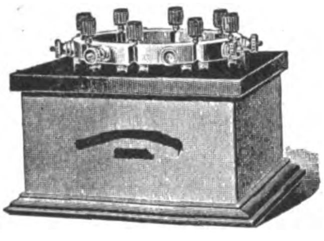

FIG. 5.

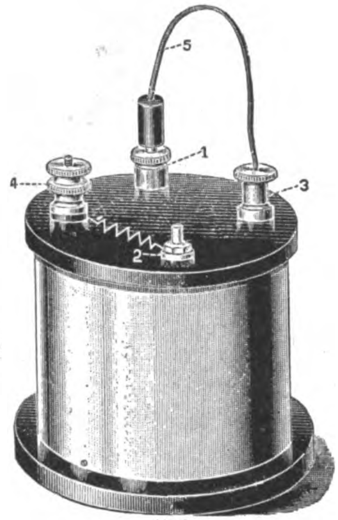

FIG. 6.

The electrician must have a wide range of standard units. These are usually made of carefully prepared coils of wire, enclosed in a substantial box with heavy rubber top, upon which a series of heavy brass bars are placed, to which ends of the coils are secured. Such a box, containing eighteen coils, is shown in Fig. 4. These coils have the denominations of .5, 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400, 1000, 2000, 3000, 4000 and 10000 ohms. A series of brass plugs are arranged to fit between the brass bars, and by inserting plugs between successive bars the coils are short-circuited, and, if all the plugs are in place, the box reads zero resistance (approximately). By removing one peg after another, more and more coils are thrown into circuit, and the box expresses any desired resistance within its capacity, the amount being read by the figures engraved on the top of the rubber opposite each brass bar. Boxes of this description, of the best makes, cost from $75 to $100. Fig. 5 shows a smaller and somewhat differently arranged type of box, known as the "square pattern," containing from six to eight coils of such resistance as may suit the purchaser. Standards of this description cost from $30 to $60. Fig. 6 is a third pattern, usually termed the "Meg-ohm Box" (million ohms), for the reason that this design is usually constructed to contain only one or two coils of very high resistance, anywhere from one to two hundred thousand to a million ohms.

Patents

PARTY LINE SYSTEM

I. H. Parsons, of Leicester, and Thomas Sloper, of Devizes, England, patent (Nos. 718,215 and 718,224) a telephone system. Both of these patents are essentially of the same nature and have for their object the provision of a device whereby party lines may be made secret. To this end the inventors, as shown in Fig. 4, provide the local circuit with a relay, g^2. This relay opens a local circuit and, therefore, unless closed by the operator, parties cannot hear. There is further a local switch, r^2, which is under the control of the subscriber.

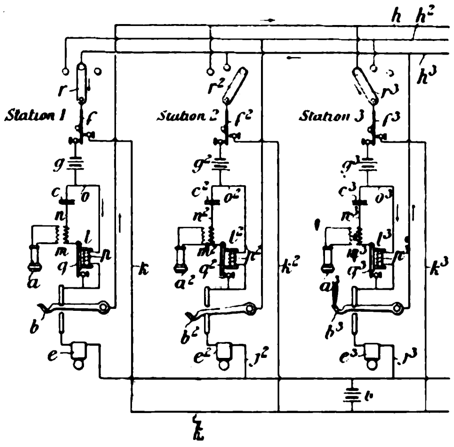

FIG. 4.

HORIZONTAL DIAPHRAGM TRANSMITTER

Miller Reese Hutchison, of New York, N. Y., patents (No. 718,204) and assigns by mesne assignments to Hutchison Accoustic Company, a telephone. This is a patent for an improved transmitter shown in Fig. 5. The inventor proposes a transmitter with a horizontal diaphragm, upon the top of which is a cup containing granular material. In this cup there are several plates electrically distinct from each other, forming electrodes, each being provided with a separate and flexible terminal. By this means the inventor hopes to obviate packing.

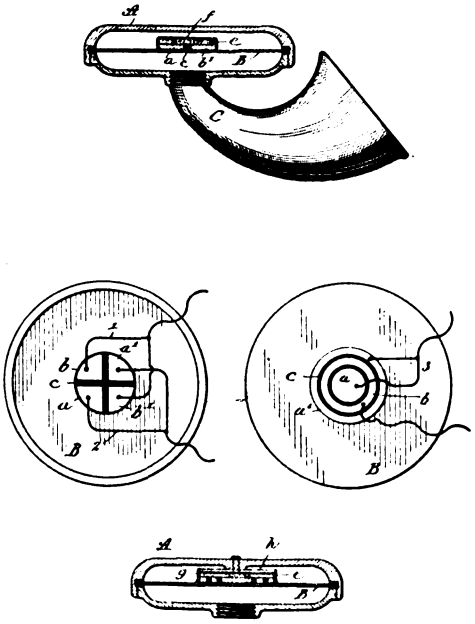

FIG. 5.

ANTISEPTIC MOUTHPIECE ATTACHMENT

John F. Logue, of Sacramento, Cal., patents (No. 718,264) an attachment for telephone mouthpieces. This invention is an antiseptic attachment for transmitters and is illustrated in Fig. 3. A curved wire is slipped over the mouthpiece and a piece of paper inserted behind it.

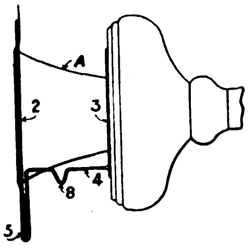

FIG. 3.

A NEW TRANSMITTER

Charles C. Cadden, of Cleveland, Ohio, patents (No. 718,310) a telephone transmitter, as shown in Figs. 6 and 7. Mr. Cadden uses a movable disc, attached by means of a rod to the transmitter diaphragm. This disc is enclosed in the carbon receptacle, the rod passing through one of its walls. There is also a washer of flexible material between the disc and the opposite wall of the carbon receptacle.

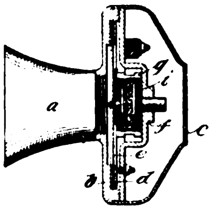

FIG. 6.

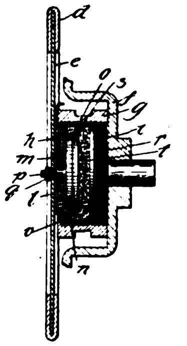

FIG. 7.

NEW KELLOGG TELEPHONE

Kempster B. Miller, of Chicago, patents (No. 718,855) and assigns to the Kellogg Switchboard & Supply Co., a sub-station set. The object of Mr. Miller's invention is to improve telephone wall sets, so as to make them convenient and simple to manufacture, inspect and repair; and also of graceful and pleasing appearance. A main object is to mount all the apparatus upon the backboard, so that the wiring and other parts may be conveniently placed and secured, and all parts adjusted before the apparatus is finally boxed up. Also to provide means whereby the boxing may be quickly removed for inspection without interfering with the working arrangement of any of the apparatus. A perspective view is shown in Fig. 8. Fig. 9 is a front view of the backboard, while Figs 10, 11 and 12, are details, showing the set with the cover removed. The reader will at once recognize the familiar Kellogg sub-station set. The condenser is secured in a compartment *O*, Fig 10, on the outside of which the hook switch is placed at *D*. The ringer *C*, is mounted in the cover B^2, that is secured against the condenser box. The top of this cover forms the writing desk of the set *B*. Inspectors and trouble men will appreciate this device on account of the ease and rapidity with which instruments can be inspected and trouble located.

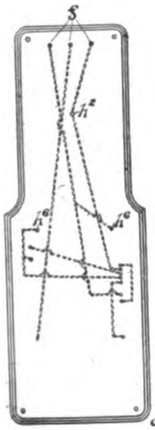

FIG. 8.

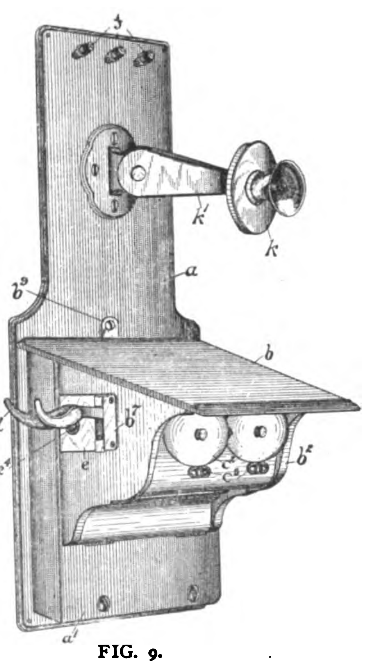

FIG. 9.

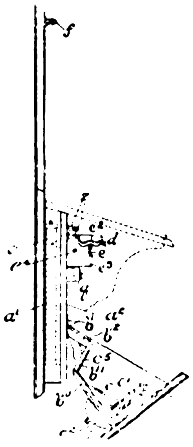

FIG. 10.

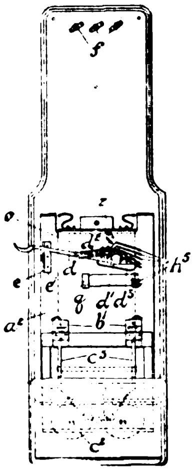

FIG. 11.

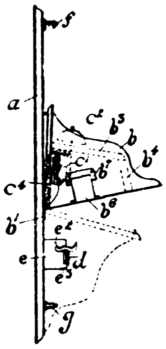

FIG. 12.

SPEAKING TUBE SET

Frank B. Wood, of New York, patents (No. 718,686) and assigns by direct and mesne assignments to Frank B. Wood, Jr., and Catherine Wood, of New York, a telephone system. This is an invention for improvement in that class of house telephone installation commonly known as "speaking tube sets." Mr. Wood's idea is to utilize the wiring commonly installed in hotels and similar places as the basis for a telephone system. This invention is illustrated in Fig. 13. *A* and *B* are supposed to be respective stations, while *C* is the office or receiving station. Each of the local stations is provided with a push-button 8, whereby the signal bell 5 can be operated. On each line the jacks 6 and 7 are provided, whereby the office telephone *C* can be plugged into any line. The rest of the circuits are self-explanatory.

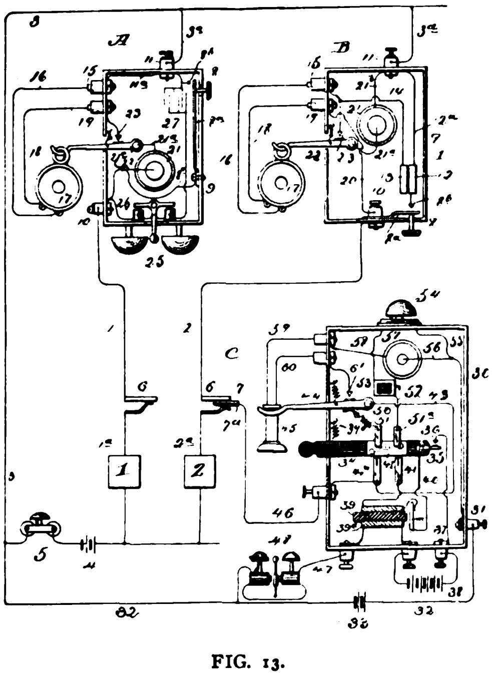

FIG. 13.

The Week's Messages

NEW COMPANIES

OAKLAND, CAL.—The Oakland Home Telephone Company has been incorporated with a capital stock of $200,000, of which $10,000 has been subscribed by the following directors: W. C. Hall and E. J. Wilcox, of San Francisco; John E. Lutz, of Oakland; W. T. Selenger, of Mountain View, and W. A. Beasly, of San Jose. The company is incorporated for a period of fifty years. Its principal place of business will be in Oakland. Telephones are to be placed in Oakland first and afterward in Berkeley, San Francisco and other places as the business of the company increases.

SARATOGA, CAL.—The Saratoga Mutual Telephone Company has been organized. Directors: R. A. Husted, president; J. T. Richards, secretary and treasurer; W. G. Tomlinson, R. L. Hogg and J. M. Lipscomb.

VANCOUVER, B. C., CAN.—Local capitalists, represented by Mr. D. G. Macdonell, are forming a company for the purpose of installing and operating a new telephone exchange.

MILTON, FLA.—Lee Daniel and others have incorporated the Gulf Coast Telephone and Telegraph Company, to construct, own and operate telephone and telegraph lines.

COEUR D'ALENE, IDAHO.—The Coeur d'Alene Telephone Company has been incorporated with a capital stock of $25,000. The head office of the company will be at Wallace. The incorporators are: L. Prager, C. C. Landes and John Morrison, of Murray, and P. F. Smith and Jacob Lockman, of Wallace.

WANDA, ILL.—Farmers around Wanda have organized a telephone company and will construct a seven-mile system. W. M. Fahnestock is president and Hugh Poag secretary.

AURORA, IND.—The People's Telephone Association of Indiana has been incorporated with a capital stock of $10,000. Directors: Bayard L. Kilgorer, Ernest W. Swarthout and George M. Roberts.

CLARK'S HILL, IND.—The People's Co-operative Company has been incorporated with a capital stock of $500. Incorporators: N. J. Bailey, W. E. Bryant, J. D. Shriner.

MONROE, IND.—The Wabash Home Telephone Company, of Monroe, has been incorporated with a capital stock of $10,000. Directors: Joseph J. Joice, F. M. Goodsell, Ed C. Von Tress, James Bonewitz, Ed P. Blann and J. Monroe Golman.

WARRINGTON, IND.—The Sugar Creek and Warrington Telephone Company has been incorporated with a capital stock of $200. The principal organizer is B. F. Reeves, of Hancock County.

WINCHESTER, IND.—An Independent telephone company has been formed to take over the plants at Winimac, Kewanee, Pulaski County, Knox and Hamlet. The officers of the company are: President, Samuel Tomlinson; secretary and treasurer, W. S. Daniel; manager, Albert Biggs. Altogether the company will take in about 150 miles of toll line.

EMMETSBURG, IA.—Emmetsburg business men have incorporated the Palo Alto Telephone Company. George H. McCarty is the first president of the institution.

GARNER, IA.—The Hancock County Rural Telephone Company has been incorporated with a capital stock of $100,000. The incorporators are: Thomas Duff, C. M. Gowdy and John Hammill, of Britt; E. L. Stilson, Walter Wildman and W. P. Chambers, of Corwith, and E. C. Abbey, of Garner. The object of the company is to erect exchanges in all the towns in the county and connect them with toll lines. They also propose to absorb the local exchanges now existing at Garner, Corwith and Kanawha, and extend their lines and service to every farm house in the county where the same is desired. The exchanges taken in are paid for by stock in the new company, all stock being issued sold at par.

BELOIT, KAS.—The Solomon Valley Telephone Company has been incorporated with a capital stock of $35,000. W. W. Dillworth, president; A. T. Rodgers, secretary; Dr. F. M. Daily, treasurer. The directors are: W. W. Dillworth, Beloit; A. T. Rodgers, Dr. F. M. Daily, Beloit; E. L. Noel, Glasco; Ralph Dockstader, Cawker. The last two named are local managers at their respective cities. This company operates exchanges at the cities named and toll and farmer lines in Mitchell County.

BLOOMINGTON, KAS.—The Farmers' Mutual Telephone Company was organized at Bloomington recently. The officers are as follows: G. B. Ruggles, president; U. S. Hahn, secretary; William Page, treasurer; W. H. Bandt, general manager. The other two stockholders are August Page and P. G. Bandt. This company will construct a line from Bloomington to connect with the Natoma-Osborne line three miles southwest of the city.

LANCASTER, KAS.—Farmers living south of Lancaster are organizing an Independent telephone line, running along the Monrovia road.

RUSSELL, KAS.—The Saline Valley Telephone Company, of Russell, has been incorporated with a capital stock of $2,000.

FRANKFORT, KY.—The Camp Ground Telephone Company, of Laurel County, has been incorporated with a capital stock of $6,000.

LEBANON, KY.—The Lebanon Independent Telephone Company has been incorporated with a capital stock of $20,000. The following are the directors: J. M. Knott, John Barr, A. Offutt, John Rubel, George D. Boldrick, C. B. Johnston and Dr. R. C. McChord. The officers are as follows: John Barr, president, Dr. R. C. McChord, vice-president, and George D. Boldrick, secretary and treasurer. The city council has granted the company a franchise.

AUGUSTA, ME.—Representative Eaton, of Calais, presented to the Legislature recently an act to incorporate the Forest Telegraph and Telephone Company and to authorize the same to construct and operate lines of telegraph and telephone throughout the counties of Washington, Hancock, Penobscot and Aroostook and within and between any or all of the cities, towns and islands of said counties and in any part or parts of said counties, commencing and terminating at such points as the company may determine. The capital stock shall be $50,000, but the corporation may increase the same from time to time by the majority vote of the stockholders, but the maximum amount shall not exceed $500,000. The corporators named are: Lemuel Brehaut, M. J. Brehaut, Wilfred L. Eaton, Frederick W. Hinckley, Albert A. Williams and Charles A. Rolfe.

PORTLAND, ME.—The International Telephone and Telegraph Company has been incorporated with a capital stock of $1,000,000, of which $500 is paid in. President, Raymond R. Gilman, of Melrose, Mass., and treasurer, Charles R. Groves, of Boston.

SWAN'S ISLAND, ME.—The Swan's Island Telegraph and Telephone Company will be incorporated, with power to operate lines of telephones and telegraph from any point in the village of Bass Harbor to Lopaus Point, both in the town of Tremont, Hancock county; thence across Bluehill Bay to Burnt Point in Swan's Island, or to any point in said Swan's Island. Capital stock is not to exceed $8,000, and H. W. Joyce, H. W. Small and H. P. Jones are named as incorporators.

STONY LAKE, MICH.—The rural telephone No. 3 has been organized with the following officers: L. B. Benton, president; Norman Nichols, secretary, and George Carpenter, treasurer.

NEW MARKET, MINN.—The Star Telephone Company, of New Market, has been incorporated, with a capital stock of $50,000. Incorporators: P. J. Welter, J. A. Sanford and Henry Sprain.

WARRENSBURG, MO.—The Westlawn Farmers' Mutual Telephone Company, composed of farmers, has been organized south of this city.

NORFOLK, NEB.—The Elkhorn Valley Telephone Company has been incorporated with a capital stock of $100,000. The incorporators of the company, which will have headquarters at Norfolk, are: G. A. Luikhart, W. K. Bowne, Owen O'Neill and I. S. Maha.

ORD, NEB.—The Ord Independent Telephone Company has filed articles of incorporation with the Secretary of State. The incorporators are Fred J. Bell, S. E. Bell, Horace M. Davis and J. D. Laverty. The capital stock is $10,000.

THE WEEK'S MESSAGES Continued

PANAMA, NEB.—The Panama Telephone Company has been incorporated by John T. Marshall, M. J. Milton, Thomas Hedges, A. F. Hitchcock, L. Was, Nanco Meveen, J. C. Walvoord and William Walvoord. The capital stock is $3,000.

WESTON, O.—The Standard Telephone Company, of Weston, has been incorporated with a capital stock of $100,000. John Bamer, Samuel Cottingham, Wilbur D. Mudge, Azon Thurston, Milton L. Bamer, are the incorporators.

JOHNSTOWN, PA.—A charter has been recently granted to the Somerset County Telephone Company. The new incorporation has optioned and controls the original Somerset County Telephone Company. It will at once begin work on extensions of the line to every important point in the county. Plans have been completed by which connection will be made with the Cumberland, Md., exchange, thus adding from 800 to 1,000 to the 600 subscribers of the company.

PITTSBURG, PA.—An application has been made to the Governor of Pennsylvania for a charter for a new Independent telephone company, to be known as the Union Telephone and Telegraph Company. It will have a capital of $3,000,000 and will build a line from the east to connect with Pittsburg and all of the Independent systems of Western Pennsylvania counties. The lines will be underground and the conduit system will be used. An attempt was made to buy the Tri-State system, which failed, and the new line will be built. The company will be financed with Eastern capital. J. S. Bryner, of Connellsville, ex-burgess, is actively interested in the new company.

WALHALLA, S. C.—The Oconee Telephone Company, of Walhalla, has been organized with a capital stock of $10,000.

SAUMSVILLE, VA.—The Saumsville Mutual Telephone Company has been organized. Rev. P. W. Wisman is president, and John W. Baker secretary and treasurer.

BARRE MILLS, WIS.—The Barre Mills Telephone Company has been incorporated.

JANESVILLE, WIS.—The Badger State Long Distance Telephone Company has been reorganized as the Badger Telephone and Telegraph Company. The promoters of the Badger Telephone and Telegraph Company are H. A. Upman, D. H. VanDyke, Charles C. Russell, John R. Fish, of Milwaukee, and Richard Valentine, of Janesville. The capital stock of the new company is $100,000 and is practically all in the hands of the five gentlemen before named. Richard Valentine is general manager. It is the intention of the company to start on a line from Beloit to Rockford and one from Delavan to Racine and eventually to Milwaukee. A line from Stoughton to Madison by way of McFarland will be built in the spring, and during the summer the lines will be extended throughout the southwest centers of the State. Another thing that will be done at once is to string copper wires wherever the lines of the company now extend.

FINANCIAL.

PARTON, ILL.—The Central Telegraph and Telephone Company, of this city, has declared a 4 per cent. semi-annual dividend.

ELKHART, IND.—The new Paris Mutual Telephone Companyg, which started business about a year ago with a capital stock of $100, has increased its capitalization to $1,000.

KINGSTON, N. Y.—The Deep Notch Telephone Company, of Kingston, has filed with the Secretary of State a certificate showing that it has increased its capital stock from $500 to $5,000. The certificate is signed by Charles Tappen, Frank A. Palen, John D. Newton, Richard Tappen and Everett Fowler, of Kingston, and Frank M. Smith and Garrett Burgent, of New York city.

MECHANICSBURG, OHIO.—The Mechanicsburg Telephone Company has increased its capital from $20,000 to $35,000.

JOHNSTOWN, PA.—Stockholders of the Johnstown Telephone Company have received the first call for 5 per cent. of the $200,000 bond issue authorized by the stockholders of the concern last May. The bonds are $50 par, will run for twenty years and bear interest at 5 per cent. The 5 per cent. installment will be used to pay for improvements to the local system. The first step in this direction will be the placing of many new cables.

PITTSTON, PA.—The directors of the Tunkhannock and Wyoming Valley Telephone Company have declared a quarterly dividend of 3 per cent., besides allowing for a liberal sinking fund.

ELECTIONS.

JOSLIN, ILL.—The Crescent Telephone Company held its annual meeting at Joslin, and the following officers were elected: President, W. H. Whiteside; vice-president, Lyman Dailey; secretary, D. W. Mumma; treasurer, John Schafer. Directors—Port Byron, L. H. Trent; Hampton, Henry Schroeder; Zuma, F. L. Wake; Canoe Creek, John Butzer; Coe, A. W. Donahoo; Erie, W. Witt; at large, Fred Frels.

ELKHART, IND.—At the annual meeting of the stockholders of the Home Telephone Company, of Elkhart county, the directors elected officers as follows: President, I. O. Wood, Goshen; vice-president, George D. Lint, Goshen; treasurer, H. B. Sykes, Elkhart; secretary and manager, George H. Fister, Elkhart. President Wood succeeded Attorney-General C. W. Miller, now at Indianapolis. The following directors were chosen: Messrs. I. O. Wood, George D. Lint, James A. Arthur, C. W. Miller, of Goshen; James Brailey, of Wauseon, Ohio; H. B. Sykes, George H. Fister, John D. Pollard, James Kavanagh, of Elkhart.

SOUTH BEND, IND.—Theodore Thorward, president of the South Bend Home Telephone Company, has returned from the annual meeting of the Logansport Home Telephone Company. All the old officers were re-elected. Mr. Thorwald is president. It was shown that over 1,300 telephones were in operation there, and that the Bell company was practically out of the field.

WABASH, IND.—A meeting of the stockholders of the Home Telephone Company was held recently and the officers for the ensuing year elected. The old officers were all re-elected, as follows: R. F. Blount, president of the board of directors; N. G. Hunter, vice-president; W. S. Stitt, secretary, and John Hipskind, treasurer, with F. M. Lake as the other member of the board. Wilder Kendall was re-elected as manager. It was decided to bond the plant, disposing of bonds as the company saw fit, for the purpose of increasing the number of patrons. A switchboard will probably be purchased for the purpose of accommodating rural patrons, and party lines will be sent out to rural patrons within a radius of five miles from the office. At present there are no rural telephones in use.

WILLOW CREEK, MINN.—At the annual meeting of the Willow Creek Telephone Company the following officers were elected: President, J. S. Parks; vice-president, J. W. Heritage; secretary, William White; treasurer, H. F. Day; directors, A. M. Hannay, H. O. Thornson and A. E. Armstrong.

ALBANY, MO.—The Albany Telephone Company elected seven directors at its annual election, as follows: M. B. Culkin, John W. Kerlin, Charles O. Patton, C. H. Kent, J. B. Foster, A. Goodman, Ed. S. Gibbany. The Albany Telephone Company has 300 shares of stock, all owned at home, and has about fifty additional telephones rented out.

ELMIRA, N. Y.—The directors of the York State Telephone Company met recently and elected officers for the ensuing year as follows: President, W. D. Barnard, Philadelphia; vice-president, Edward Davis, Philadelphia; secretary and treasurer, Robert M. Dougal, Philadelphia; directors, S. L. Johns, McSherrytown, Pa.; Boyd McDowell, Elmira; Ward R. Bliss, Chester, Pa.; W. D. Barnard, St. Davids, Pa.; Ellis L. Orvis, Bellefonte, Pa.; R. G. Parke, Philadelphia; Meade D. Detweiler, Harrisburg, Pa.; T. B. Crary, Binghamton; H. H. Light, Lebanon, Pa.; Eli S. Rheinhold, Mahanoy City, Pa.; E. M. Yarnell, Philadelphia; C. M. Clement, Sunbury, Pa.; Edward Davies, Philadelphia; G. R. Van Allen, Northumberland, Pa.; E. M. Leader, Shamokin, Pa.; W. A. Thompson, Coatesville, Pa.; S. P. Light, Lebanon, Pa.; Eugene Diven, Elmira. Directors of the Elmira Telephone Company were re-elected.

HERKIMER, N. Y.—The County Telephone Company, at its annual meeting, elected officers and directors for the ensuing year as follows: Directors—W. I. Taber, Robert Earl and F. Arthur Fagan, Herkimer; E. L. Barber and J. S. Brailey, Jr., of Wauseon, O., and James Conklin, of Ilion. The officers elected at a subsequent meeting of directors were: President, Robert Earl; vice-president, James Conklin; treasurer, W. I. Taber; secretary and manager, James Fagan. The company now has in the towns of Herkimer, Mohawk, Ilion and Frankfort over 800 telephones, over 300 of which are in Herkimer, and a large number will be added each year. The old Bell company had in the four towns before the installation of the county company but forty telephones.

NORTH SANFORD, N. Y.—The annual meeting of the stockholders of the Delaware Valley Telephone Company was held at North Sanford. The following are the names of directors elected: E. E. Crane, G. C. Valentine, N. D. Blowers, H. N. French, N. D. Baily, George Beilby, John Meek, M. J. Mudge, A. Shepard, Joe Wheeler, Erwin Axtell, Seymour Beatman, Clark Hendrickson, Chester Teed, Charles Sampson. The following officers were chosen: President, Chester Teed; vice-president, G. C. Valentine; secretary, Charles Sampson; treasurer, George Beilby.

STEDMAN, N. Y.—The annual meeting of the Stedman Co-operative Telephone Company was held at Stedman recently. The officers were re-elected for the ensuing year. They are: A. M. Hawley, president; H. N. Palmer, secretary; M. C. Tefft, treasurer; R. D. Dowles, P. C. Tickner and A. L. Gleason, executive committee.

AKRON, OHIO.—The stockholders of the Akron People's Telephone Company met recently and chose the following directors: Will Christy, R. M. Pillmore, R. S. Iredell and W. F. Laubach, of Akron; J. R. Nutt and H. C. Lang, of Cleveland, and C. W. DeVoe, of Warren.

DELAWARE, OHIO.—The stockholders of the Citizens' Telephone Company held their annual meeting recently and voted to increase the capital of the company from $60,000 to $100,000. Seven new directors were elected, as follows: W. M. Heseltine, W. G. Hormell, J. L. Anderson, G. H. Carter, W. Guy Jones, C. D. Young, W. B. Hedges. The officers elected for the ensuing year are: President, W. M. Heseltine; vice-president, W. G. Hormell; secretary, G. H. Carter; treasurer, F. P. Hills.

HASKINS, OHIO.—The Haskins Mutual Telephone Company has elected these directors: F. A. Robertson, J. F. Brand, W. D. Moore, George Moore, J. A. Bowers, E. C. Thornton and Fred Dauer. The directors elected these officers: J. F. Brand, president; F. A. Robertson, vice-president; E. C. Thornton, secretary and treasurer; W. T. Moore, general manager. The company expects to extend its lines and put in many new telephones in the near future.

SALEM, OHIO.—At the recent annual meeting of the Columbiana County Telephone Company the following directors were elected: W. C. Morran, Lisbon; W. D. McKeefrey, Leetonia; W. F. Crosby, Salem; Frederick Dickson, James B. Hoge and Maxime Reber, Cleveland.

BROOKLYN, PA.—At the annual meeting of the Brooklyn Telephone Association the following officers were elected: President, George H. Terry; secretary, L. S. Ely; treasurer, E. F. Ely.

CHERRYFLATS, PA.—At the third annual meeting of stockholders of the Farmers' Mutual Telephone Company, held at Cherryflats, the number of directors was reduced from twelve to five. The directors chosen for 1903 are: Francis Kelley, West Covington; J. L. Hagar, Mansfield; George F. Curtiss, Chatham Valley; W. W. Bastian, Liberty Borough; Eugene Thomas, Hartsfield. The officers chosen are: President, J. F. Haverly, Cherryflats; secretary and treasurer, L. E. Thompson, Cherryflats.

DELMAR, PA.—At the annual meeting of the stockholders of the Delmar and Hoytville Telephone Company these directors were elected to serve during 1903: Henry Mitchell and W. B. Eberenz, of Delmar, and E. D. Welliver, C. C. Miller and Orson Williammee, of Morris. These officers were elected: President F. H. Marvin, Antrim; secretary, D. S. Field, Wellsboro; treasurer, Frank Roland, Wellsboro. The company, which was organized between two and three years ago, now has lines running from the Farmers' Mutual central in Wellsboro to Morris, Blackwell and Nauvoo, and from Wellsboro to Stonyfork and Tiadaghton, where connection is made with Leetonia.

MANSFIELD, PA.—A notable gathering of local telephone interests was held in Mansfield recently. It was the annual meeting of the Citizens' Mutual Telephone Company. There were also present delegations from the Farmers' Mutual and the new Mansfield-Mainesburg direct line. A resolution was passed to accept the new Mainesburg line at completion as part of the Citizens' Mutual. Citizens' and Farmers' Mutual representatives, acting in conjunction, decided to open at once a central for both systems. It also was decided to double wire the Citizens' Mutual line from Covington to Troy. The following officers and directors of the Citizens' were elected: President, W. J. Squires; secretary, W. A. Davey; treasurer, H. J. Ripley; directors, James Cudworth, Charles Strange, Frank Parkhurst, C. J. Beach, Miles Button.

SWEET VALLEY, PA.—The annual meeting of the Farmers' Telephone and Supply Company was held at Sweet Valley recently. The following were elected officers for the year: President, Dr. C. A. Long; vice-president, I. A. Long; secretary and treasurer, C. B. Wheeler; directors, B. F. Croop, M. A. Benscoter, W. E. Harter, George Wesley, A. H. Baer; auditors, C. E. Whitesell, Corey Allen, H. G. Wandel; general manager, A. T. Dymond.

WASHINGTON, PA.—The stockholders of the West Penn Telephone Company held a meeting at Washington, at which the following were elected directors for three years: C. M. Hunter, of Independence; E. C. Donaldson, of Midway; W. E. Stevens, of Burgettstown; Major J. W. Nesbit, of Oakdale, and Richard Gladden, of McDonald. W. L. Scott, of McDonald, was elected secretary and treasurer, and D. E. Hervey, of Wellsburg, W. Va., auditor. The directors of the company reorganized by electing Major Nesbit as president and C. M. Hunter, of West Middleton, superintendent of the company's lines The company operates in Washington, Green and Allegheny counties, and has been in financial straits for some time. Several weeks ago an application for a receiver was made, and the Washington county courts appointed J. M. Dunn receiver. It is the intention to thoroughly reorganize the affairs of the company and place it on a better foundation. The principal stockholders have formed a syndicate and will as soon as possible purchase the property from Receiver Dunn as a new company. Another name will be chosen and the capital stock will be increased. The lines in all sections will be improved and extended and first-class service installed. The service at Washington will be improved and a first-class system put in.

CORINTH, VT.—At the annual meeting of the stockholders of the Corinth Co-operative Telephone Company the new charter obtained at the late legislative session for the Orange County Telephone Company was accepted and new directors were chosen, consisting of Charles L. Spear, of Corinth; George Brown, of Tunbridge; Dr. H. H. McIntyre, of Randolph; George Crane, of Brookfield; George E. Stacy, of Vershire; Eugene H. Kennedy, of Chelsea, and Martin W. Chamberlain, of Washington. The directors afterwards chose Charles L. Spear, president; George Crane, vice-president; Roscoe H. Williams, of Corinth, secretary and treasurer; Curtis S. Emery, of Chelsea, auditor.

FRANCHISES.

SAN FRANCISCO, CAL.—The Supervisors' Public Utilities Committee has received an application from M. A. King for a franchise to operate a general telephone and telegraph business. The application is for a fifty years' franchise for an underground conduit system, the work of construction to begin in four months. The conduit district is to be of sufficient capacity to accommodate at least 20,000 subscribers, and the sum of $250,000 is to be expended in three years. The promoters will give fifty free telephones to the city and 150 pairs of free wires for the police and fire department. The rate for business telephones is to be $60 per year and for residences $30 per year, with no party lines. King said he is prepared to bid $50,000 for the franchise under the Broughton act. William Smith, another applicant for a telephone franchise, stated that his system insured a rapid and secret service. He asked that consideration be postponed two weeks, when he would furnish the names of the proposed incorporators of the system with a capitalization of $3,000,000 and a capacity of 20,000 telephones. Business telephones, he said, would cost $5 per month, residence telephones $2.50 and a two-party line $1.50 each. The committee postponed action on the petitions for two weeks.

CYNTHIANA, IND.—W. A. McGregor & Company, of Vincennes, asked for a franchise for an Independent Telephone line through the corporation at a recent meeting of the board.

LE MARS, IND.—At a meeting of the city council recently a resolution was passed calling for a special election to be held on Monday, February 16, for the purpose of voting on the question of granting a franchise to the Le Mars Telephone Company.

HARRODSBURG, KY.—A recent session of the Fiscal Court the Independent Long Distance Telephone and Telegraph Company was granted a telephone franchise in and through Mercer county.

DETROIT, MICH.—It is understood that the officials of the Federal Telephone Company are not worrying very much regarding the vetoing of their Detroit franchise by the mayor of Detroit. The mayor, it is understood, told the representative of the Federal Telephone Company that he vetoed the ordinance because a part of the people of Detroit wanted it vetoed, but at the same time he understood the telephone company could go ahead and build the plant under the general state law and charge whatever prices for service it desired. The company will probably follow the mayor's suggestion and complete the Detroit plant.

MASON, MICH.—The Mason and Vantown Telephone Company has asked permission of the common council to construct and operate a local exchange.

BELVIDERE, N. J.—The Belvidere common council has granted a franchise to the Warren Telephone Company to run its wire through the town.

HAMMONDSPORT, N. Y.—At the last meeting of the board of trustees a franchise was granted to a number of farmers and vineyardists living northwest of Hammondsport for a private telephone line, which will run from their residences to different places of business in the village. Construction on this will be begun at once.

ELIZABETH CITY, N. C.—The city council has granted an extension of the franchise of the Elizabeth City Telephone Company for thirty years.

BARABOO, WIS.—The Baraboo Telephone Company has presented a new ordinance to the council, granting a franchise to the company for a period of twenty-five years, allowing the company to charge $24 a year rental in business houses and $15 a year in residences, on condition that the company put in a new switchboard within a year and otherwise improve the service.

COMPETITION.

OAKLAND, CAL.—The Oakland Home Telephone Company, which secured a franchise from the City Council for $1,500, has commenced erecting poles for its new system and has solicitors seeking subscribers at rates that represent a substantial cut under those now charged by the Sunset company. In its contract the new company says no subscriber will have to pay for his telephone until 1,000 paid subscribers are on the lines, and it also promises to do away with party lines. The representatives of the Home company say the material for their new system is on the way from the East and that their lines will soon be in successful operation. No definite time has been set for the commencement of the service, but the contracts being offered prospective subscribers provide for the installation of the telephone at once. In private residences the new company asks the rate of $2.25 a month, and $4.25 a month for business houses, with a discount of 25 cents if the bill is paid by the 10th of each month.

GAS CITY, IND.—A war is on in Gas City between the United and the Central Union Telephone companies. Heretofore the Central Union has had the field at Gas City and Jonesboro to itself, but the new company has established an exchange in each of the two towns and the companies are now in hot competition. The Central Union Company is said to have more than

THE WEEK'S MESSAGES—Continued.

200 subscribers in the Twin cities, but with the advent of the new company into the field many people have ordered the old telephone taken out. The United company opened its exchange but recently, and its subscribers are being connected up as fast as possible. It now has 150 subscribers on its list and applications for many more. It is said that at least fifty subscribers of the Central Union Company have ordered its telephones removed from their residences and places of business, and have subscribed for the new company's telephones. The Central Union is not removing any of its telephones, but is leaving them and allowing the subscribers their use without pay. It was stated by an official connected with the Central Union Company that these people will be given free service for one year as an inducement not to use the new company's telephone. At present the rates of the two companies are the same, being $1.50 per month for residences and $2 for business houses.

WAUSAU, WIS.—The Wausau Telephone Company is composed of local people and has practically driven the old Bell telephone exchange from the field. The rates charged by the home company are $2 for business and $1 for residence telephones.

COMBINATIONS.

ROCKFORD, ILL.—The mutual telephone lines of Whiteside county are consolidating into one company. All the Independent lines have agreed to this consolidation with the exception of the line running directly from Morrison to Prophetstown and known as the "Trout" line.

TULSA, I. T.—The Indian Territory Telephone Company, of Vinita, has bought the franchise, city exchange and business of the Indianaola Telephone Company, of Tulsa.

CEDAR FALLS, IA.—The Hudson and Finchford rural telephone companies are contemplating a merger, with officers and central exchange at Cedar Falls.

LA PORTE, IA.—The Wettstein Telephone Company and the Electric Light and Telephone Company of La Porte City have merged under the title of the La Porte Public Utility Company.

FULTON, N. Y.—A movement is on foot for the improvement of the Fulton Telephone Company's service in connection with that of the Ontario Telephone Company in Oswego and those of other companies in the northern and central part of the State. Locally the service has outgrown the switchboard in use and a new one is to be substituted, and arrangements are to be made for a service to farmers throughout the country where the main service extends. It is probable that the plan will be carried out in the coming spring.

AKRON, O.—The Akron People's Telephone Company is about to acquire the four Home or Independent telephone lines in Portage county and to branch out in several other directions. The Portage county lines which will be acquired include the local exchanges in Kent, Ravenna, Mantua and Garrettsville. The officers of the Akron company are: President, Will Christy; vice-president, C. W. DeVoe; secretary, J. S. Benner; treasurer, J. R. Nutt; general manager, W. F. Laubach.

AMBLER, PA.—The Keystone Telephone Company has acquired control of the Independent system here and will give Philadelphia connections to Ambler patrons.

BEEVILLE, TEX.—The Alice, Wade City and Corpus Christi Telephone Company, with an exchange in this city, has been sold to A. J. Moore, of the Eureka Telephone Company, of San Antonio. He says his company will immediately make extensive improvements in the system.

CONSTRUCTION.

SCOTTSBORO, ALA.—It is reported that the Jackson County Telephone Company will build a line to Langston and connect with an Independent line from Attalla, Gadsden and other points.

SEARCY, ARK.—Under the efficient management of R. A. Ward the Searcy Telephone Company has enjoyed a steady increase in patronage. A new 100-drop section of switchboard has been ordered and is expected to be here before February 1, when it will be installed in connection with the two sections already in use.

SHERBROOKE, QUE, CAN.—The People's Telephone Company will improve its system here.

SAVANNAH, GA.—The Georgia Telephone and Telegraph Company has begun the construction of a line to Statesboro, having previously purchased an interest in the exchange at Statesboro, which is owned by the Statesboro Telephone Company.

ROCKFORD, ILL.—The directors of the Home Telephone Company have decided to extend the Rockford line to Freeport, Beloit and Belvidere, and to connect with the Inter-State Independent Telephone Company's lines. This move has been contemplated for some time by the directors. Secretary J. H. Camlin says the contract for building the long distance equipment will be let at once. The Rockford exchange was accepted from the contractors as in good working condition. The company has installed to date 1,400 instruments and has orders for 250 more, which are being installed as rapidly as the material can be secured.

TAYLOR RIDGE, ILL.—At a meeting of the Taylor Ridge Switch Association, an organization composed of representatives of the various mutual telephone lines centering here, Joseph Kell, Fred Salpaugh and Robert Miller were appointed a committee to investigate the plan of building trunk telephone lines connecting Taylor Ridge with Milan, Edgington and Reynolds. This, if accomplished, will make it possible for the entire lower end of the county to secure reasonably good service with the tri-cities, a thing that with the present condition of the lines would be out of the question.

LIBERTY, IND.—The Liberty Telephone Company, under a franchise recently granted by the board of county commissioners, will make considerable extensions in its lines in this county, commencing the work next spring. The company proposes to extend the line northeast to Goodwin's Corner and vicinity beyond. A new line will also be built to Clifton and eventually extended north from that point.

WATERLOO, IA.—Within a few days Waterloo is to have a new telephone line, which will connect this city with Dunkerton, Fairbanks, Jesup and probably other points to the north and east. The promoters of the new line are P. E. Canfield and Mrs. Harriet Canfield, of Dunkerton.

BALDWIN, KAS.—The Baldwin Telephone Company is constructing its first long distance line, which will give connection with the Ottawa system, including about forty stations in Eastern Kansas.

LARNED, KAS.—The Larned Telephone Company will soon install a new section of switchboard, as on account of the rapid growth of its system here its first section is now filled.

PAWNEE ROCK, KAS.—The Rock Telephone Company is making arrangements to install a number of sound-proof talking booths at Larned and at other places on its line. A pay station will also be established at each booth for the convenience of the public.

HUDSON, MICH.—A rural telephone line is being constructed from North Adams to Osseo, which when completed will connect with the Rollin Telephone line, which reaches Osseo from Pittsford, and will place Hudson in communication with a considerable new territory.

ANDES, N. Y.—The farmers of Dingle Hill are talking of stringing a wire from Andes to connect with Arena. This line, if built, will be bridged and take on all intermediate farmers between the towns.

DARIEN, N. Y.—The Darien Rural Telephone Company proposes to extend the present line west to Darien Center, north to Sawens, about four miles, and as far east as patrons desire it.

LOCKPORT, N. Y.—The Home Telephone Company is talking of putting in a line from Lockport to Royalton Center.

MIDDLETOWN, N. Y.—The Orange County Telephone Company, of Middletown, is planning to extend its lines and will probably issue bonds to raise the funds necessary.

SPRINGWATER, N. Y.—The Springwater Telephone Company, at a meeting of the stockholders, considered the project of extending its service by building two new lines, one northward to Bald Hill and the other westward through about six miles of farming country and into the village of Scottsburg.

BELLEVUE, OHIO.—The Local Telephone Company will shortly close a contract for central office equipment for Norwalk, Ohio. The equipment will consist of multiple switchboard for party line service. Each cord circuit will be equipped with four-party selective indicating keys. Specifications for this plant were drawn by LeRoy W. Stanton, of Cleveland, Ohio.

DUSHORE, PA.—A telephone line from Lovelton to Dushore is to be erected. A meeting was held at Dushore recently at which officers of the proposed company were elected. The company is called The Farmers' Telephone Company, Limited. Shares in the company are valued at $5 each and nearly $500 has already been subscribed. The balance, it is expected, will be raised in a few weeks.

EDINBORO, PA.—At the annual meeting of stockholders of the Edinboro Co-operative Telephone Association the following executive committee was elected to serve for one year: W Perry, F. L. Hoskins, D. E. Gillespie, Dr. G. W. Minium, C. L. Darrow, G. H. Cornell, P. W. Tucker, C. J. Cooper. The motion to reorganize the company as a corporation with a capital stock of $20,000 was carried. The purpose of this reorganization is to construct lines reaching to Crossingville, Pageville, Lavery, Ivarea, Franklin Corners, Itley, McLallen Corners, etc., and to install a service which will completely cover all the territory around Edinboro.

MISCELLANEOUS

SUMNER, IA.—The Sumner Telephone Company has reorganized, and is now under entirely new management. For the present the headquarters will be at Sumner, but it is anticipated that Oelwein will soon be the head-

THE WEEK'S MESSAGES Concluded.

quarters of the company. The new officers are: President, E. A. Hurmence, Sumner; vice-president, F. Wolfe, Sumner; secretary, Fred Pleggenkhule, Hawkeye; treasurer, E. A. Humence, Sumner; auditor, J. W. Knight, Oelwein, and attorney, F. W. McClure, Sumner.

FREMONT, NEB.—The Fremont Telephone Company has its plant in operation with 100 telephones, and the remainder will be added as rapidly as possible. The company has some 500 subscribers on its list.

FITCHVILLE, O.—The Clinton Line Telephone Company, recently organized here, has at present quite a number of telephones in use and will soon have its line extended to New London, where it will connect with the long distance line. E. K. Jennings is president of the company. By early spring lines will be established on most of the roads throughout the township.

LA RUE, O.—On January 1, 1902, the number of telephones in use by the La Rue Telephone Company was 265, and in the new directory which will be issued shortly there will be 420 names, an increase of almost 100 per cent. The company now has in operation six main leads out of La Rue, traversing every road that leaves La Rue. There are 285 farmer subscribers on these lines, and had it been possible to secure material a number of other party lines could have been erected that would accommodate as many more rural residents who are anxious to secure the connection. W. F. Kniffin reports that they have already contracted for 125 telephones to be put in next summer.

WAPAKONETA, OHIO.—The directors of the Schaffer Telephone Company of Texas held an important meeting in this city recently to hear the annual report of A. E. Schaffer, of this city, the general manager, and to lay plans for the future. This company, capitalized for $100,000, has several exchanges and toll lines in Ennis and other counties in Texas. Among those present were C. D. Crites and Walter B. Richie, prominent capitalists of Lima; George Whitney, cashier First National Bank of Marysville; E. L. Hoskins, Probate Judge of Shelby county; C. E. Dunan, cashier First National Bank of St. Marys; S. A. Van Oss, cashier Citizens' Bank of Minster, and others equally prominent.

PHILADELPHIA, PA.—The Keystone Real Estate and Building Company has conveyed to the Keystone Telephone Company seven exchange buildings in various sections of the city for a nominal consideration, subject to mortgages aggregating $210,000.

KINGSTREE, S. C.—The Kingstree telephone exchange has been leased by R. K. Wallace for one year, with the privilege of purchasing the franchise and appurtenances at the end of that period. The exchange will be removed to another building, and Mr. Wallace will give the switchboard a thorough overhauling, put all the telephones in order and repair all the lines of the system within the corporate limits of the town.

NASHVILLE, TENN.—The Cumberland Telephone & Telegraph Company has issued a statement of its business for the month of December, 1902, and growth in the number of subscribers is shown as follows:

Number of subscribers Dec. 1, 1902	90,590
Number of subscribers added during month	3,916
Number subscribers discontinued during month	2,081
Net increase for the month	1,835
Total Number of subscribers in system Dec. 31, 1902	92,425

PLATTEVILLE, WIS.—The Platteville, Rewey & Ellenboro Telephone Company, by Johnson Bevan, president, and P. H. Jeardeau, secretary, filed an amendment changing the location of the incorporation from town of Lima to Platteville and increasing the territory of the corporation from Grant, Iowa, and La Fayette counties to the State of Wisconsin in general.

OBITUARY

FREDERICKSBURG, VA.—Hon. H. E. Crismond, one of the most prominent of Fredericksburg's citizens, died suddenly of heart trouble at his home here recently, aged 53 years. Mr. Crismond was secretary of the Rappahannock, Piedmont and Fredericksburg Telephone Company, of this city.

PERSONAL

GREELEY, COL.—E. J. McMurray has resigned his position as general manager of the Northern Colorado Independent Telephone Company, to take effect as soon as a man can be secured to fill the place. He will devote most of his time to the Morgan county company, though he will retain his holdings in the first named company.

ITHACA, N. Y.—B. G. Hubbell, president of the Ithaca Telephone Company, is ill at his home in Buffalo with appendicitis. While not critical, his condition is being carefully watched.

NORWALK, O.—Harry Graham, for several years manager of the Norwalk Telephone Company, has resigned his position and is at present in Oberlin helping to fix up the exchange there which was burnt out last week by an electric trolley wire.

TRADE NOTES

The W. G. Nagel Electric Company, Toledo, Ohio, is now prepared to quote prices on telephone lamps of all voltages and styles. Prompt shipments can be made.

Jones & Winter, of Chicago, Ill., have been awarded the contract for the outside work of the Fort Worth Telephone Company's plant at Fort Worth, Texas. This contract amounts to about $200,000.

Wm. F. Hoffman, formerly of Detroit, Mich., where he held the position of general foreman for the Michigan Telephone Company, and late foreman of the Mechanical Department of the Citizens' Telephone Company, of Grand Rapids, is now superintendent for Frank B. Cook, Chicago, manufacturer of telephone apparatus.

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

TWO TELEPHONE EXCHANGES of 325 telephones in Missouri towns only 8 miles apart, 21 miles metallic and 30 miles grounded toll lines. Both exchanges and nearly all toll lines rebuilt this year and in first-class condition. Present owners desire to sell on account of too much other business to look after. Address LOCK BOX 4, Malden, Mo.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

WANTED, position as manager or assistant of an exchange of 200 to 500 subscribers. Several years' experience; can give good references. Address J. E. Thurston, North Vernon, Indiana.

POSITION by an all-round telephone man, as manager of small exchange or as inspector or troubleman. At present with Bell company. Address W. M. G., care American Telephone Journal.

POSITION WANTED by young man of experience and thorough reliability, with ability to give an exchange the care and attention it should have. It may be to your interest to write me, stating salary. Address RELIABILITY, care American Telephone Journal.

A COMPETENT MAN to take charge as Manager of a 200-subscriber telephone exchange. Position permanent on merit. Address Box 212, Milford, Indiana.

TELEPHONE SUPPLY SALESMAN with 15 years' experience as superintendent construction, manager operating department, right of way buyer, and salesman and installer of pay stations in U. S. and Canada, will be open for position January 15th. Address G. N. J., care The American Telephone Journal, New York.

I WANT the exclusive handling of an account, for Chicago trade, beginning January 1st. Manufacturers' Agency basis. Address Salesman, care American Telephone Journal, Monadnock Building, Chicago.

The American Telephone Journal

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SOME STEPS IN THE EVOLUTION OF CIRCUIT DESIGN
ARTICLE IX.—THE PARTY LINE CIRCUITS

By J. C. Kelsey

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IN the earliest party line systems the subscribers' instruments were located in series, and as many parties were placed on a line as could be signaled by the ringing generator. Fig. 53 is a diagrammatic representation of the series system. Each bell was wound to a resistance of 80 ohms, and consequently each subscriber added this resistance to the talking circuit; and presently so many bells were introduced as to render conversation difficult, if not impractical. To overcome this defect a condenser was placed in parallel with each bell, as is indicated in Fig. 54. It has previously been shown that the opposition offered to voice currents of high frequency by a coil with an iron core is exceedingly serious; whereas, a condenser presents a much easier path and, consequently, by shunting the various bells, as is shown in Fig. 54, the conversational powers of the series system were much improved. Still the number of subscribers which could be placed on the series system was limited by the ability of the ringing generators to affect the various bells. It might be supposed that the insertion of the condenser would detract from the power of the ringing generator to call various stations, but it must be recollected that the opposition presented by the condenser is somewhat in proportion to the frequency of the impressed electro-motive force. Voice currents with very high frequency can pass easily through the condenser, while the very much smaller frequency of the ringing current finds in the condenser a serious obstacle and, therefore, selects the bell circuit in preference. Fig. 55 shows the complete wiring of a series party line system using a grounded return.

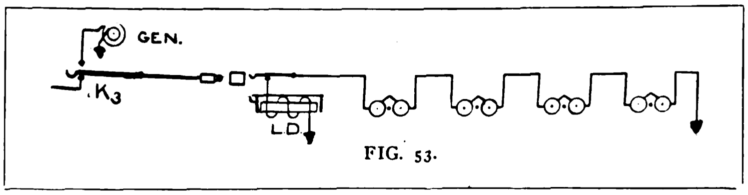

FIG. 53.

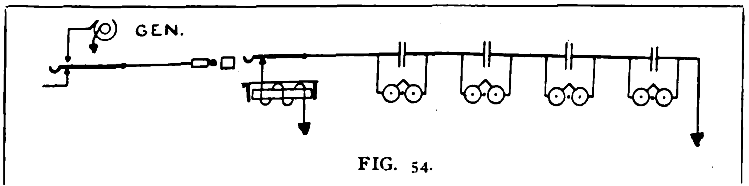

FIG. 54.

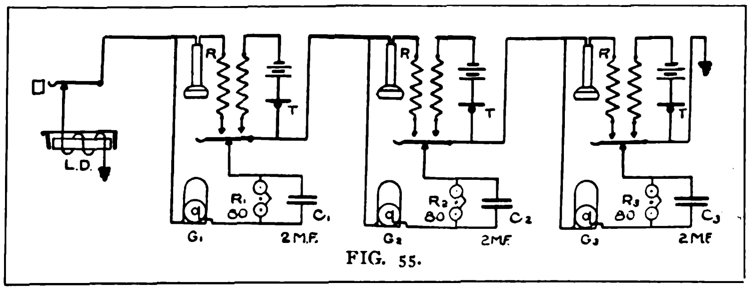

FIG. 55.

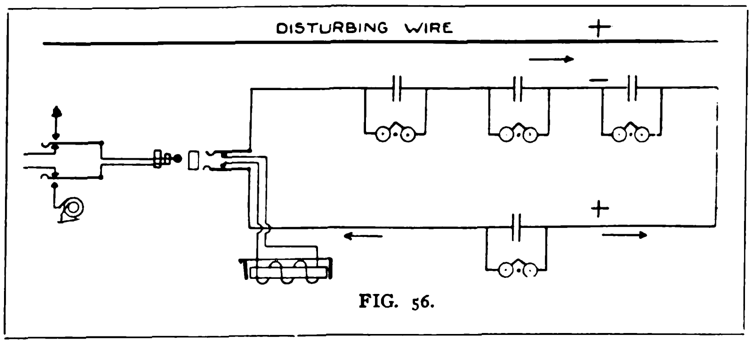

FIG. 56.

There were many difficulties encountered with the series system, a formidable one being that of induction, as shown in Fig. 56. In this illustration, three parties are shown upon one side of the line and one upon the other, and it is assumed that a trolley wire or other perturbing circuit parallels the telephone line. The disturbing circuit induces a positive charge upon one side of the party line, which seeks equilibrium; but, owing to a greater resistance in one side of the line than the other, an unbalance is set up and lines of this description become unbearably noisy, so that in instances of this kind it is necessary to place an equal number of parties on both sides of every circuit.

In the bridging system, as shown in Fig. 57, an entirely different condition exists. So far as any unbalance of the line is concerned, the number and position of the subscribers is immaterial, and a party may be added or taken away without changing the conditions.

Again, any number of subscribers may be added without seriously affecting transmission, so this circuit is practically limited by the ability of the ringing generators to affect the various bells. For the bridging system the 80-ohm bells and shunt generators of the series system cannot be employed, for the conditions of the bridging system demand a bell with a resistance of at least a thousand ohms and a generator which is normally open. Fig. 58 is an illustration of the complete circuits of a metallic bridging party line system.

In both the series and the bridging system, as described, the sending of ringing impulses over the line will affect all the bells connected thereto to the obvious inconvenience of all the subscribers who are not desired. There have been many attempts to devise party line systems whereby only the desired one of a group of subscribers would be called. Such systems have been termed "selective ringing systems." The simplest method of accomplishing selective ringing is shown in Fig. 59. In this circuit there are two subscribers, one on one side of the line and the other on the other. To ring either subscriber the proper alternating current is sent over one side of the line to which the subscriber is attached,

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Editor's Note.—The first article of this series appeared in the issue of Nov. 29. They will continue for many months.

and returns to the central office by the ground. Thus, so far as ringing is concerned, each subscriber has an entirely independent circuit. This circuit is shown in detail in Fig. 60, but it is obvious that under these circumstances the capacity of the party line is limited to two parties. To obviate this difficulty the circuit shown in Fig. 61 has been very largely employed. In this circuit there are four parties, two of which are placed upon one side of the line and two are on the other, the return circuit of all bells being grounded, as shown in Fig. 61. In order to make ringing completely selective a ringing generator, capable of giving both positive and negative impulses of current, is provided at the central office. The bells of the various subscribers are provided with adjustable springs, so arranged that the bell armature can be pulled either toward the positive or the negative pole of the magnets that form the ringers. Under such conditions each bell will only respond to the ringing impulses, which augment the magnetism of the ringer magnets; thus, by sending a positive current over one side of the line, the bell marked "plus" in Fig. 61 will respond, while the bell marked "minus" will remain silent. By sending a negative current over the same side of the line the "minus" bell will respond and the positive one will remain quiet. Similarly, on the other side of the line, either the positive or negative bell may be made to respond, dependent solely upon which kind of current is submitted.

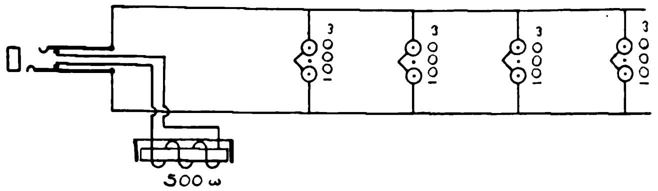


FIG. 57.

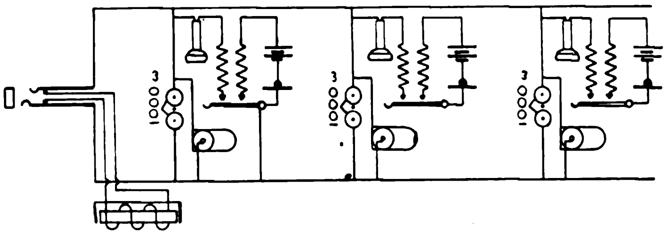


FIG. 58.

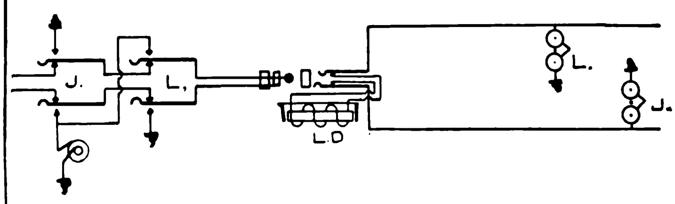


FIG. 59.

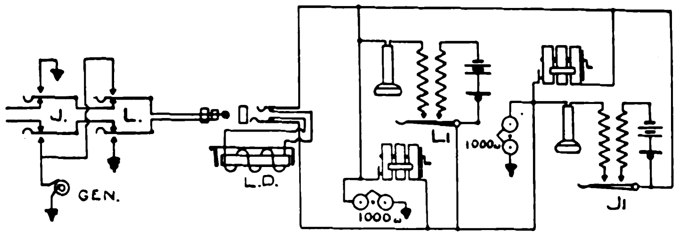


FIG. 60.

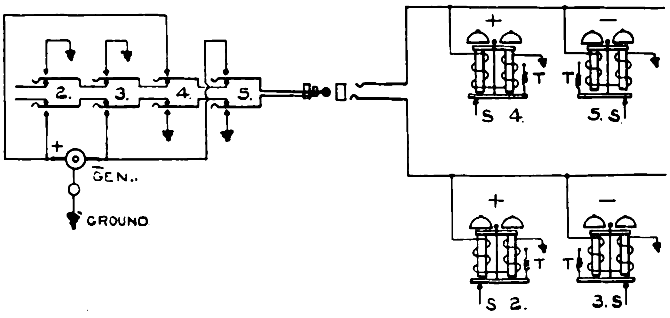
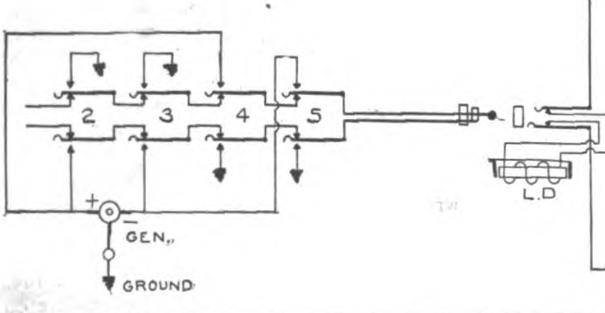


FIG. 61.

By this means an exceedingly simple and useful selective party line system has been devised, which is very widely used in practice.

In Fig. 62 the circuit of the four party selective system is worked out in detail, and in Fig. 63, another form, which accomplishes the same result, is shown.



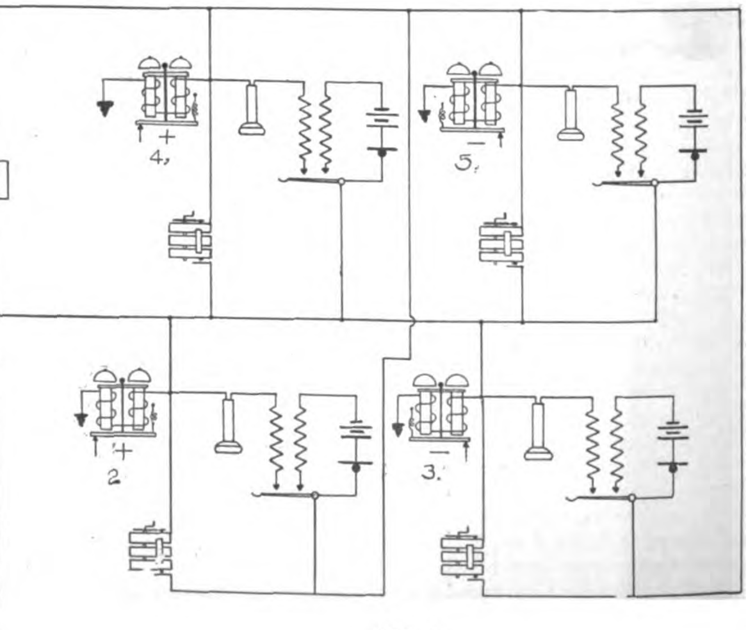


FIG. 62.

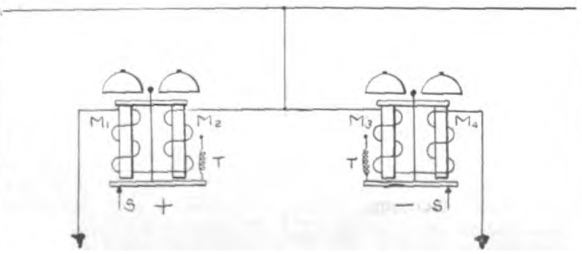


FIG. 63.

FOREIGN CURRENTS

By "The Arrester."

A RECENT issue of our English contemporary *The Electrical Times* contains an article by Mr. A. R. Bennett entitled "Telephone Competition in 1902," in which the writer reviews the progress of competitive or rather municipal telephony in Great Britain during the year just ended. During the year two new municipal systems have reached the active stage—those of Portsmouth and Swansea. Portsmouth is already working with four small exchanges in partial operation and construction is beginning at Swansea. In Swansea a special central office building is being put up, to cost $11,000 this being the first instance of a corporation providing a special building for its telephone exchange. At Brighton, contracts have been made for the greater part of the construction and work will begin in a month or so. The Brighton scheme has a historical interest as part of the famous old Pavilion built by George IV., when Prince Regent, is to be altered to accommodate the exchange equipment. At Hull no decision has yet been arrived at regarding the proposed municipal system. Other notes in the electrical papers referring to Hull, relate that the committee deputed to visit Portsmouth and Tunbridge Wells will present two conflicting reports, so probably the Hull scheme will meet with internal opposition. That ends the record of new schemes for 1902 and it is not a very brilliant one. One can hardly help comparing this feeble showing with the enormous development that has taken place in America during the same period.

* * *

Tunbridge Wells having been wiped out, there are but two existing systems having any history for Mr. Bennett to refer to. The first Independent exchange—that of the States of Guernsey—has continued to advance during the year, and had 1,094 working lines on December 31, with 56 orders in hand, making the ratio of telephones to population 1 to 36, which is by far the best figure, says Mr. Bennett, ever attained by a British telephone exchange. The average receipts per line will not probably exceed $15, but a reserve fund and net profit are maintained. At Glasgow the number of lines increased from 3,075 to 7,500, an increase of 4,425 for the year, and there were 1,200 orders on hand, which looks as if the corporation were hard put to it to keep up with the work. The National Company has about the same number of telephones in the area so the proportion of telephones to population in the Glasgow area is 1 to 50. Mr. Bennett thinks that the stimulus of municipal competition has not only aided the development of the telephone in Glasgow, but also improved the service. It goes without saying that the corporation service is good, while the company has also, Mr. Bennett kindly adds, made great, and not wholly unsuccessful efforts to improve!

* * *

When it comes to Tunbridge Wells and the Post Office Mr. Bennett has no good words to say of either. In fact his language referring to both, if translated into the vernacular would be distinctly what is commonly termed "bad." The sale of the Tunbridge Wells system is attributed to a mixture of feebleness and corruption and the consent of the Post Office is strongly criticized. "Had consent to the transfer been withheld" says Mr. Bennett, "the corporation would have been forced, to its own ultimate benefit, to go on with the undertaking or to sell it to the Post Office for any sum the latter might choose to give. But in telephone matters Post Office policy has ever been ununderstandable of ordinary mortals, and this failure to make a good bargain for the country is only another instance of the inability of St. Martin's-le-Grand to cope with the telephone interests." According to Mr. Bennett many other corporations are considering municipal telephony more or less seriously. Manchester, Salford and Stockport propose to obtain a joint license to operate in the Manchester telephone area, a plan which as it constitutes a fresh departure is beset with considerable practical difficulty. Speaking of the Post Office London system Mr. Bennett indulges in a final fling at the authorities. The number of subscribers he says at the end of the year was 6,200 and it is expected that 600 or 700 new stations will be joined up every month. "The service is favorably spoken of, and there should be no doubt as to the ultimate success of the enterprise. Still, the balance sheet of the undertaking for the first year, if debited with interest, sinking fund and depreciation, would be very interesting reading, and would, I am afraid, show results which, if there be any justice or reason in the Tunbridge Wells example, should imperatively call for its immediate sale to the National Telephone Company."

* * *

In its comments on Mr. Bennett's article *The Electrical Times* thinks that he admirably summarizes the progress made up to date (no very difficult job one would think since the "progress" has been of such a very restricted order) and if he is rather severe on the Post Office, that is but natural under the circumstances. Quite so, and the Post Office will hardly lose its sleep over Mr. Bennett's criticisms. "On the general subject of telephony we continue to believe" says *The Electrical Times* "that the best solution practicable in this country is the co-ordination of the entire service under government management, and the sooner the better. Until that comes about the next best solution is vigorous competition in places where local opinion calls unmistakably for an alternative to N. T. C. monopoly. Competition must in the majority of cases arise from the municipalities, since private companies have so far exhibited no great readiness to stand up against the huge resources of the N. T. C. Great Britain is committed for good or bad to the proposition that the monopoly of telephonic communication belongs to the State."

* * *

The latest official information on the Glasgow system is that the Telephone Committee of the Glasgow Town Council have recommended that application be made to the Secretary for Scotland for further borrowing powers to the amount of $400,000, making a total capital account of $1,500,000. It is stated that 7,500 lines are actually working and that wires have been laid for over 8,000 additional telephones. There are 1,300 orders on hand and new orders are received at the rate of about 10 per working day. A total of $1,120,000 has been spent on the undertaking and the application for a new loan has been made because the borrowing powers of $1,000,000 already obtained, are exhausted. Taken in connection with the figures given above these figures are rather curious. With new orders coming in at the rate of only 300 per month it looks odd that the department should have 1,300 orders on hand; that it should be over four months behind its work. Having spent over $1,100,000 in equipping 7,500 working lines and allowed orders to accumulate to the extent of nearly twenty per cent. of the working system; having provided also 8,000 spare lines, it looks odd that $400,000 should be required to bring the accumulated orders into the condition of working lines. The apportioning of the Glasgow capital expenditure to "completed" lines and to "partially completed lines" will before long become a work so complicated that an expert mathematician will have to be added to the staff.

* * *

A correspondent writes to the London *Electrician* all the way from Australia to suggest a name of his own coinage for the hand telephone set that originated in Sweden and has come into general use in many parts of the world because of its handiness and convenience. In Sweden this form of telephone—transmitter and receiver on one handle—was christened micro-telephone, presumably because what we call a transmitter is generally called a microphone in most foreign tongues and because the hand set combines both microphone and telephone. But the name has not stuck in English as it is not only awkward but conveys a false meaning. The Australian correspondent gives "micro-telephone" three marks of exclamation and also disapproves of "hand set," while as to calling it either transmitter or receiver he says it is both. The name he suggests is "converser," which is ridiculous, far-fetched, untechnical and liable to confusion with "converter." The "hand set" is the logical name for the hand set as it is now commonly called. We have wall set, cabinet set and desk set, so the natural term for the combined instrument which enables one to hold both transmitter and receiver in one hand and to sit back in one's chair in comfort is the hand set. True, a hand set may be anchored either to a wall or a desk base, but the simple and direct English language gets round that difficulty easily by saying "will you have a wall hand set, or a desk hand set." And if you value your time and comfort you will answer "Both."

COMPETITION THE INDEPENDENTS FACE IN THE NEW ENGLAND STATES

By Lewis A. Goudy, Vice-President and General Manager, the Northeastern Telephone Company.
Portland, Me.

It is the hope and expectation of Independents, that the year 1903 will show a very great expansion of the Independent telephone business in the East and Northeast. Heretofore, the great power, financial, political and otherwise, of the Bell Telephone Company and its licensees, has prevented successful extension of competitive telephone service in this section of the country. The New England press is largely influenced and in many cases subsidized by the Bell, so that information as to the great expansion and development of Independent telephony throughout the central, western, northwestern and southwestern sections of the country, is suppressed. This, of course, does not apply to the better class of papers, which as in other parts of the country, are fair in their treatment of competitive telephony, and correctly express the sentiments of the general public. It is authoritatively stated, however, that eighty per cent. of the press of New England is thus subsidized by the Bell Company. That this is true, the following contract which the press of New England has made with the Bell Company or its licensees, conclusively shows:

AGREEMENT made this....................day of........ ......by and between..........................publishing the newspaper known as.......................at................. party of the first part, and the NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY, party of the second part.

1. The party of the first part, in consideration of the within agreements of the second party, hereby agrees as follows: To furnish whenever called upon to do so by the second party, a three inch space, single column, in its newspaper for such advertising or other matter as said second party may desire to insert in said space, advertising or other matter furnished by the second party for insertion to be published at such and for so long times as said second party may require during the term of this contract.

2. Said party of the second part, in consideration of the foregoing agreements of the first party, hereby agrees as follows: To furnish to the first party, at its business office, in said........ .... while this contract is in force, one set of telephone instruments with long distance transmitter equipped with metallic circuit, for the price of one-half the regular yearly exchange rate for like service in the exchange in which said set of instruments is furnished.

To permit said first party to use its toll lines for communications from said set of instruments without charge to an amount equal, at its regular tariff charges for such use, to one-half the regular yearly exchange rate for said set of instruments.

To furnish said set of telephone instruments and the above stipulated service subject to all the terms and conditions of its regular contracts for exchange telephone service and to its service regulations from time to time in force.

3. It is further understood and agreed that the first party will mail to the second party at its Boston address, one copy of each issue of its newspaper without charge, *and that said first party will at all times exercise its good will in said second party's interest and co-operate with said second party, so far as it can consistently do so, in the conduct of its newspaper.*

4. This contract shall remain in force for the period of one year from its date and thereafter until terminated by 30 days' notice in writing from either party to the other.

Executed in duplicate the day and year first above written.

....

New England Telephone and Telegraph Company.............
By....................................

Section 1 of this contract and the last half of section 3 show the consideration and the subserviency thereunder, to and by some of the New England newspapers. Under such conditions, the representative of Independent telephony in the Northeast, the Northeastern Telephone Company, through its officials, has been unable to disseminate through the press, the great development in the Independent field, other than by usual price for advertising matter. Editorial support, neither general nor local, can be secured.

In addition to this the great transportation companies, railroads and express, are under contract with the Bell Company, debarring the establishment of Independent instruments in any railroad or express company offices. This holds good, even if the instruments are tendered rental free for the use of and convenience of patrons of Independent companies. The following article from the Boston *Herald* of November 22, 1902, shows to what an extent the people of one section of New Hampshire alone, are debarred from their rights and privileges:

Laconia, N. H., Nov. 22.—The local telephone war which has been in progress for the past six years in this city received a fresh impetus during the past summer. A box of the citizens' company was for some years located in the ticket office and telegraph office at the Laconia passenger station of the Boston and Maine railroad.

This box was removed last spring, which caused much dissatisfaction among the subscribers of the system, who number some 600 or more in Laconia and vicinity. An effort to get the instrument replaced was unsuccessful, through negotiations with the local railroad officials, and a petition to the president of the road which was signed by practically all of the local manufacturers and business men was the result during this early summer.

In this connection it developed that the New England company was the only obstacle in the way of granting of the request of the petitioners by reason of a contract possessed by said company giving it the exclusive right to telephone connections with the stations of the road. A movement was then started, which was to result in the loss of numerous telephones to the New England Company in the city, and this week permission has been granted for the placing of the citizens' box in the station. Since the citizens' system was started in Laconia, the New England Company has maintained a rate of $1 for two instruments, or 50 cents per instrument per month.

These two instances are not overdrawn. They are not mere isolated cases, but are the rule all over New England.

All these things and many others, have in a measure retarded the growth of the Independent telephone business in the East and Northeast. But despite all the efforts of the Bell to choke off Independent development and the promulgation of news concerning Independent movement, Independent telephony is surely gaining a foothold in this, the stronghold of the Bell Telephone Company.

In Portland, Maine, the Northeastern Telephone Company is now installing a system equipped for 2,500 subscribers and with an ultimate capacity of 6,000 lines. It has purchased a lot in the central part of the city, on which it will erect a new three story, fire-proof building to be used as offices for the company and as an exchange. Plans for this building are being prepared by a local architect, and it will be completed during the winter.

The Northeastern Company expects to have its system completed and to give service by the first of October this year. Contracts are now being secured for subscribers and they are coming in at a rapid rate.

In Portland the Bell operates 2,200 subscribers, and its rates are, for this small number, extortionate. From $24 for six party line service, they range up to $84 for individual lines, business or residence.

The Northeastern Company will charge $24 for residence and $42 for business telephones. It now operates several hundred miles of toll lines in Maine which will be added to, and all connected with the Portland exchange.

BELL MUST TRANSMIT MESSAGE.

The Louisville Home Telephone Company, Louisville, Ky., has received news of a decision of Judge Patterson, at Lebanon, Ky., in an important matter. A branch of the Cumberland Company at Lebanon is alleged to have refused to transmit a message from Campbellsville because it did not originate with the Cumberland Company. Judge Patterson issued a mandatory injunction requiring the Cumberland Company to transmit the message.

EFFECT OF THE MULTIPLE SWITCHBOARD ON TRAFFIC[*]

By E. F. Sherwood.

FOR the past eight years it has been the practice in New York to make tests to show the quality of the service. These tests show the time taken by the operator to answer subscribers' calls, the time taken to complete local and trunk connections, the time taken to disconnect after conversations are finished, the percentage of connections on which irregularities occur, etc. Records of these tests have been valuable not only as a means of showing in what respects improvements in the service might be made, but have afforded accurate information as to the improvements brought about by the installation of relay switchboards.

The first relay switchboard installed in New York was cut into service on November 13, 1898, and the last one November 2, 1901. The tests of service for the year preceding the installation of the first relay switchboard in New York and for the year 1902 show the following results:

	Avg. time taken by operator to answer.	Avg. time taken to complete local connections.	Avg. time taken to complete trunk connections.	Avg. time taken to disconnect.
1897	7.7	27.6	50.7	17.1
1902	3.8	23.7	30.7	2.8

The improvement made in the time of answering is due to two causes: First, the answering jacks in the relay board are immediately associated with the line lamps, so that no time is lost by the operator in locating the answering jack corresponding with the calling signal; and, second, with relay equipment, subscribers' lines are promptly released after conversations are finished and delays due to slow clearing out of previous connections do not occur.

The improvement in the time taken to complete connections is partly due to the use of trunk line machine ringing keys, which, when set, cause the bell of the called subscriber to ring intermittently until the receiver is removed from the hook, and partly to the use of cord supervisory signals, which show whether the called subscriber has answered or not and enable the operator to give a second or a third ring when necessary without delay. The slowness of disconnection with the old type magneto switchboard was largely due to the failure of the subscriber to ring off; something like fourteen per cent. of the subscribers hung up their telephone without giving any signal, and the operator had to discover whether the subscriber had finished by listening on the line.

The improvement in the time of disconnection is entirely due to the use of cord supervisory signals, which immediately light when the receiver is placed on the hook, and enable the operator to disconnect without listening in. In fact, the work of making disconnections is largely an overlapping operation and is frequently performed simultaneously with other operations which require the use of the operator's telephone.

Further evidence that the installation of relay switchboards has improved the service is furnished by the record of written complaints from subscribers. During the year 1897, when the average number of subscribers' lines in service in Manhattan was 17,066, a daily average of 3.2 written complaints were received, or one complaint a day for every 53.30 lines. During the year 1902, when the average number of subscribers' lines in service in Manhattan was 49,955 ,a daily average of 3.3 written complaints were received or only one complaint a day for every 15,138 lines; or to put it another way, at the rate of one complaint for each line every forty-one years.

Since the installation of the first relay board in New York, the number of lines in Manhattan has increased from 20,740 to 53,792 and the number of stations in Manhattan has increased from 25,516 to 91,945. During this time the daily average number of calls originated by subscribers has increased from 243,590 to 549,940, and the daily average number of connections handled by each subscriber operator has been increased from 750 to 1,070.

The evolution of the telephone switchboard has made it possible to establish a school for the instruction and training of new operators.

This school is equipped with a switchboard, which, on a small scale, is just as complete as any switchboard in service and is so designed that all types of calls are handled by the student operators in practice in exactly the same way that they are handled at the regular central offices.

In this school student operators are thoroughly instructed in the theory and practice of telephone operating. They attend 12 lectures given by the head of the school, and after each lecture they put in practice at the school switchboard the instructions given in the lecture. In this way they learn how to handle the switchboard apparatus, trunk lines, etc., and by actual practice the methods of handling the various classes of traffic. The course of instructions is such that on being transferred to a regular central office, student operators are competent to handle moderately busy switchboard positions.

Before the operators' school was established, the new operators were sent to the various central offices and were instructed by experienced operators, who devoted to them as much time as could be spared from their regular duties and permitted them to practice at the switchboard when the traffic was light. The great disadvantages of this method of training operators were that students had a great deal of time during which they were not occupied except in listening in with another operator, and when they first began to handle subscribers' calls they were not as proficient as operators who have had experience at the school switchboard.

The principal advantages of our present method of instructing new operators over the old method of training them in the various central offices are as follows:

1. The raw student element has been entirely eliminated from the central office, thereby greatly reducing the amount of interference with the service caused by inexperienced operators.
2. The students, in being trained by expert teachers, acquire a uniformity of method, which has proved to be very beneficial.
3. The time required to develop a new operator into an expert operator has been reduced two months by the establishment of the school.
4. The total cost of training operators in the school is less than it was when they were educated in the various central offices.

With the evolution of the telephone switchboard, as I have already pointed out, there has gone on a corresponding development in the methods of operation, or handling the "traffic," as it is nowadays called. This development is by no means limited to the mere routine to be followed by operators in working the switchboard. It has been applied to the founding of the Traffic Department, the organization immediately charged with the duty of giving at all times to the public, prompt and satisfactory service. So large have some of these departments grown that, in the number of their employees, the complexity of their organization, and the importance of their work, they may be compared to the entire organization of a telephone company of years ago.

To adequately deal with the traffic questions and operating methods required in connection with growing systems and changing types of switchboard, there has come a demand for the telephone engineer specially skilled in these matters. In all of the large telephone companies nowadays we have a traffic engineer, whose special duty it is to study switchboard problems in their particular relations to operating methods.

EARLY TELEPHONE ON EXHIBITION.

S. A. Selser, of Doylestown, Pa., has deposited in the Bucks County Historical Society Museum the first pair of telephones ever used in Bucks county. On May 16, 1878, Mr. Selser and Thomas Frazer talked from Doylestown to Quakertown over the Western Union telegraph lines, virtually stealing the line for that Sunday afternoon by cutting out connections south of Doylestown and north of Quakertown.

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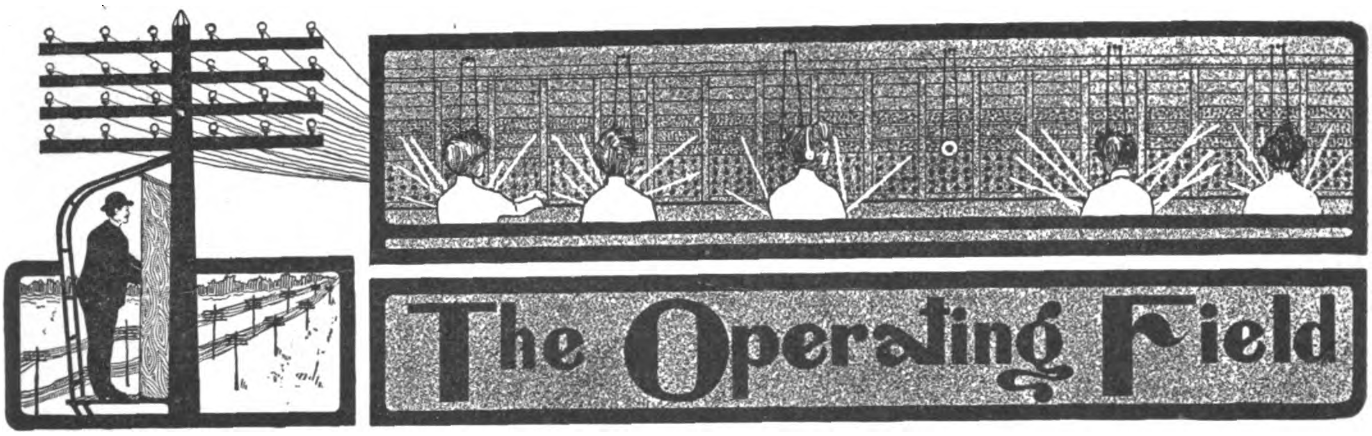
[*] Abstract of discussion at the 172d meeting American Institute of Electrical Engineers, New York, January 23, 1903.



The Operating Field

AUTOMATIC TELEPHONES FOR IOWA TOWNS.

DURING the latter part of January The Commonwealth Telephone Company was organized with headquarters at Waterloo, Iowa. It secured control of the following telephone properties in Iowa: Cedar Valley Telephone Company, The County Telephone and Telegraph Company, The Waverly Telephone System, The Hardin County Telephone System, The Parkersburg Telephone System and The La Porte City Telephone System.

These systems supply the following cities with telephone service: Waterloo, Cedar Falls, Normal, Waverly, Eldora, Traer, Parkersburg, Reinbeck, Shell Rock, Ackley, Dysart, Clarksville, Allison, LaPorte City, Bristow, Dumont, Hudson, Tripoli, Grundy Center.

The principal parties interested in The Commonwealth Company are: C. H. Geist and A. G. Wheeler, Jr., treasurer of The Automatic Electric Company of Chicago, also director of The Illinois Telephone and Telegraph Company.

The new company has a capital stock of $900,000 and will operate in eight Iowa counties. The reconstruction of the entire consolidated system is proposed, and the automatic telephone apparatus made by the Automatic Electric Company, of Chicago, will be installed in Waterloo and the other towns.

TELEPHONE MERGER IS ENJOINED.

THE foreclosure sale of the franchise, actual property and assets of the Richmond Telephone Company, which was to have occurred recently, by which the Southern Bell Telephone Company would have secured the corporation, thereby securing a monopoly of the business in Richmond, has been held up through the efforts of W. C. Himroth, of Chicago, and his attorneys.

Judge Waddill, of the United States Circuit Court for the Eastern District of Virginia, signed a temporary restraining order in Norfolk, and a bill in equity was filed with the Circuit Court clerk.

In granting the temporary injunction, Judge Waddill fixed the 23d of February as a date for hearing the case. By agreement between the attorneys, however, the argument may be heard within three days. An effort will be made to get a hearing at the earliest possible moment, as each day's delay means a big loss to the Richmond Company. It is claimed that the franchise of the Richmond Telephone Company is its principal asset, and with this the property could easily be sold for $150,000.

TWO WISCONSIN COMPANIES REORGANIZED.

THE Little Wolf River Valley Telephone Company of Fond du Lac, Wis., and the Badger State Long Distance Telephone Company, which operates throughout the southern part of Wisconsin, are to be reorganized in the very near future on a sound financial and business basis. These companies, since their organization, have prospered exceedingly from a business standpoint; each one was immensely popular with the telephone-using public, and business came with a rush. Their facilities were soon inadequate to take in new business, however, and they remained at a standstill; sufficient capital to make the necessary enlargements could not be had.

This was particularly true of the Little Wolf River Valley Company, which was permitted to go into the hands of a receiver last April because of its failure to take care of its indebtedness, and especially the interest on its indebtedness, although it was earning a fair profit over and above all operating expenses and fixed charges. When the time came for liquidating the indebtedness of the company by the receiver, the stockholders, instead of selling out, were on hand with a plan to put new life into the organization. They will increase the capital stock from $125,000 to $175,000 or $200,000. This increase will be amply sufficient to put the company on a sound footing. That this plan carried weight with it can be readily seen from the fact that the stock which had been offered for sale by some of the small holders at from ten to twenty cents on the dollar, can now not be had at any price below par value.

This action of the directors has encouraged outside capital to a marked degree. There is now a proposition to extend the lines of the company so as to cover the entire State and to enter into traffic agreement with all the Independent companies in the State. It is certain that these plans will be carried out in the near future.

The Little Wolf River Valley Company was organized at Weyauwega, Wis., six years ago. About three years ago the offices and management of the company were moved to Fond du Lac, where the largest exchange is located and where most of the large stockholders reside.

The Badger State Long Distance Company also permitted its creditors to commence foreclosure proceedings. Just a few days before the date of the sale, however, the stockholders came to the rescue and secured the co-operation of outside capitalists, with the result that the company will now be placed on a sound footing. It is thought likely that the company will be merged with a larger Independent company and financed on a thorough basis.

The effect of the reorganization of these companies on the Independent business in Wisconsin will be great. Their temporary embarrassment served to intimidate Wisconsin capital and to prevent its investment in Independent securities. Now, however, that these companies have been reorganized and new life infused into them, capital will be forthcoming and a boom is sure to result all over the State.

UNION ELECTRIC TELEPHONE COMPANY MEETING.

THE annual meeting of the Union Electric Telephone and Telegraph Company was held at the company's building in Rock Island, Ill., on Wednesday, January 28, 1903, and a gratifying report was made to the stockholders by President Hamilton, detailing the growth of the company since last March, when the present board of directors took charge of the property, briefly stating that the Rock Island exchange had been opened on December 20, 1902, and the Moline exchange on January 3, 1903. The company has been rushing work on its Davenport, Iowa, exchange, and it will be started this month with over 700 local telephones. A Sterling switchboard of 1,800 drops is being installed at Davenport, making a total of over 2,000 telephones in operation. The company's three buildings are almost identical and are said to be the handsomest models of their kind in the Central West. The president also recommended the installation of 1,000 additional telephones to meet the demands of the public in the three cities and the making of toll line contracts with a number of Illinois and Iowa companies, which agreements are now being drawn.

The stock of the company is nearly all held in Harrisburg, Pa., and many of the stockholders were present at the meeting which resulted in the election of the following officers: President, Naudain Hamilton; secretary, C. A. Lee, both of Harrisburg, Pa., and treasurer, John W. Morrison, Wayne, Pa. The directors are as follows: N. Hamilton, C. A. Lee, James Russ, J. A. Fritchey and G. B. Stucker, of Harrisburg, Pa.; J. W. Morrison, Wayne, Pa., and H. Daudistel, Rock Island, Ill.

Both S. W. Fitzgerald and H. Daudistel were relieved as manager and superintendent respectively on January 29, 1903.

The Valley Construction Company, of Wilmington, Del., has the contract for the installation of the company's system in the three cities where the company now operates. The Tri-city system now has thirteen miles of underground work carrying over thirty-five miles of duct and some eighty miles of pole line. There are 170 manholes, each 5x5x5, and exclusive copper circuits are in service, there being no iron wire used at all. There are 1,800 drops at Davenport; 1,200 at Rock Island and 1,000 at Moline.

"NUMBER PLEASE" GIRLS' BALL.

The management of the Citizens' Telephone Company, of Jackson, Mich., recently gave a dancing party for the company's operators.

The function was a decided success and greatly added to the popularity of the Citizens' Company. The large hall in which the dance was held was tastefully decorated in the national colors. At one end was a canopy formed of banners and across its front was hung a streamer stamped with the motto, "Independent." In front of the canopy was a long cord, attached from side to side, from which were suspended a number of receivers. Underneath the receivers was a large placard bearing the words, "Receive Her." Each operator was presented with a miniature receiver suspended from a pretty chain. This little decoration was the remembrance of the American Electric Telephone Company. In the front parlor a telephone was attached from the wall with the word "hello" printed above and "Why don't you say hello" below.

The programmes were unique. On the front page appeared a cut of the Kellogg instrument used by the company and on the last page the company's shield and ensigna.

The dance numbers carried out the telephonic idea in a decidedly clever manner. They were as follows:

1. Waltz..The Telephone Girl
2. Two Step..Number, Please
3. Waltz.......A—4—11—44
4. Gavotte.....Long Distance
5. Two Step............3900
6. Waltz.............Kellogg
7. Quadrill...Four Party Line
8. Two Step......Lines Busy
9. Waltz.....Our Rural Lines
10. Extra.....Metallic Circuit

1. Waltz.........Chief—100
2. Two Step..Dyke's 24 Volts
3. Waltz, Our Manager's Delight
4. Circle Two Step, Independent Field
5. Waltz..........Hans Nix
6. Tom Jones......Wing Line
7. Two Step..Flash a Number
8. Rye Waltz......Grass Lake
9. Two Step....Don't Answer
10. Extra......One on the Bell

INDEPENDENT STOCK A GOOD INVESTMENT.

In a recent number of *Finance* appeared the following: The United States Telephone Company continues to make splendid gains. Toledo is now giving the company a gross business of $1,000 a month and the various towns that have been connected are showing nice increases. The gross earnings now indicate that the company is earning at the rate of $60,000 a year on its capital stock and this next year is figured to show sensational increases. The Frontier Telephone Company at Buffalo will soon be in operation and connections will at once be made with the United States Telephone Company, giving the latter company a great deal of business from Buffalo and giving it connection with a great many exchanges in New York State, including Albany, Schenectady, and other towns. The United States first mortgage bonds are regarded as one of the best telephone securities on the market and the only reason that they are selling at so low a figure is because the public doesn't understand their value and because Cleveland is the poorest telephone market in the United States, a condition which has been brought about by the embarrassment of the Federal Telephone Company. The Toledo Home Telephone Company now has 6,000 telephones connected and is doing a splendid business. The new switchboard is in perfect working order and everybody seems to be satisfied. The company is now earning on a basis of about 5 per cent. for the stock and the officials expect to declare a 2 per cent. semi-annual dividend about the first day of next October. There has been a marked increase in the demand for the stock the past few days, and 23 has been bid for it with almost none offered. It is figured that the stock will reach 30 or 40 within the next few months.

POPULARITY OF FARMERS' TELEPHONES.

In an article in the *Christian Register* Rev. E. P. Powell says that the telephone is much more widely used by the farmers of the Northern States than by the people in cities, and he fortifies this statement by citing a city in New York State with sixty thousand inhabitants where there is only one telephone for every six families, while in a country township near by a population of five hundred families is supplied with two hundred telephones. It is certain that the telephone is becoming an indispensable agent in country life. Throughout the entire country the farmers are beginning to see that they cannot afford to be outside the limits of the telephone system, and thousands of instruments are being installed in rural homes every year. For a few dollars a year the farmer keeps in close touch with the neighboring towns, knows just what prices he can obtain for his products if he goes to market and is informed every day, if he desires, of the principal occurrences in the world.

Mr. Powell says: "In my own house my sons frequently play the violin for a group of a dozen or more families scattered over a radius of two or three miles. The music is heard as perfectly in the most remote house as in the nearest. In the same way the women of a circuit have established telephone tea parties. At a certain hour they sit down to their telephones, drink their own tea and distribute the gossip. We imagine that news is softened that goes over the telephone. At any rate the town will lose its rapid gait, each person, will have a hearing. Such a party requires no special dressing, no labor of walking or waste of time. There is no reason why this sort of service may not cover much club work."

NOVEL SUIT BROUGHT AGAINST SUNSET TELEPHONE COMPANY.

We are hearing continued reports that our 'phone has been taken out,' or 'is out of order,' until we are tired out and sick. We want it corrected so people can reach us. This service is worth paying for. Ring us up and help us to get it fixed."

Thus the Musselman Company, of Los Angeles, Cal., announced in an advertisement recently, in which it offered to pay 5 cents cash to every subscriber of the Sunset (Bell) Telephone Company who should succeed in securing telephone connection with its office before a certain date.

In a suit now pending in the Superior Court of California the whole matter is explained in detail. Although paying $6.50 a month for service the company continually was annoyed by the blundering, dilatory responses of central. Constant neglect to make the desired connections seemed to be cutting into the monetary earnings of the company.

The advertisement was devised as a means of ascertaining if the Sunset could do better under pressure. The result was gratifying. Thirty-two persons succeeded in getting the Musselman Company before the prescribed date, and to each was mailed 5 cents in cash, involving an expenditure of $1.60 in carrying out the cash payment, 64 cents for postage, $1.62 for stationery and a stenographer's service in mailing the letters, in addition to $27.50 paid for the advertisements and $5 for clerk's service, as alleged, in answering the telephone.

Having ascertained that the desired service could be obtained, the company began to reckon up what it had lost by previous negligence of the Sunset Telephone Company. An agent of the Sunset company, whose attention had been attracted to the advertisement, called and promised future prompt switches, which have since been made, but that does not offset the old score. The Musselman company demands judgment for $1,536.36 damages in a suit against the telephone company. The odd change is for expenses incidental to the advertisement and the $1,500 for injury to business in the past.

OPINION AND COMMENT

IS THE OSTRICH POLICY DEAD?

IN our columns last week we printed an abstract of a paper on the "Evolution of the Telephone Switchboard," presented by Mr. Lockwood at the meeting of the American Society of Electrical Engineers on January 23. This paper is remarkable in that it breaks the silence with which the American Telephone and Telegraph Company and its affiliated organizations have for more than ten years past shrouded all subjects telephonic. The Bell company does not lack able engineers and telephonists, nor good writers, as is evidenced by Mr. Carty's ancient and classic paper on "Telephone Induction," and the joint production of Messrs. Hibbard and Carty, "A New Era in Telephony." But since these contributions were published, the unutterableness of the Sphinx has been almost exceeded by the tenacity with which the Bell company has refused the utterance of a single syllable on telephone subjects. In this respect a policy has been maintained directly opposed to the course of other electrical interests.

Rightly or wrongly, it has always been assumed that this course was but another endeavor to support a tottering monopoly, for, so far as the real advancement of the art is concerned, nothing can be more foolish, short-sighted, or suicidal than the repression of the freedom of speech and discussion. In this respect the Independent companies, with their frequent conventions and meetings, and the establishment of several telephonic papers, have set the Bell a wise example and read it a wholesome lesson.

Can it be that Mr. Lockwood's paper means that the Bell people are really profiting by this teaching? We sincerely hope so. The Bell company should be too wise to play the ostrich any longer. So many Independent telephonists are graduates, and recent ones, from the Bell ranks, that it is folly for that company to believe that it has any secrets of vital importance.

Telephony as an art is by no means finished. The ocean of future experience and development is infinite, and a frank, free and cordial exchange of opinions and experience will hurt no one and help every one. Here Mr. Lockwood's paper is disappointing. The author in some thirty pages gives a very careful and accurate statement of the development of the telephone switchboard. All of the important devices and circuits are explained and illustrated and, historically, the paper is valuable and unparalleled; but Mr. Lockwood draws no deductions and points no moral. What is the coming switchboard? From the experience of the past, what is the earnest of the future? The author would probably reply that his text was the *evolution* of the switchboard, and that he had stuck to it. Very true, and the most rabid pro-Bellite could not express a harsher criticism than to say that the paper was perfectly innocuous. But the silence is broken, and we are grateful to Mr. Lockwood for his boldness in taking the preliminary plunge. May his example be rapidly and frequently followed.

FOREIGN LONG DISTANCE LINES.

THE long distance telephone line, uniting Paris and Rome, was placed in service on December 25, 1902. Under the late convention between the two governments (French and Italian) there has been constructed a copper metallic line, four millimeters in diameter (about No. 6, B. & S.). From the tariff standpoint, each of the two states has been divided into two zones beginning at the frontier, and the rates respectively are 30 cents, 40 cents and 60 cents for three-minute conversations.

In Italy the first zone comprises the provinces which extend from the frontier to Massa and Brescia; the second zone reaches to the provinces of Rome and Ancona. In France the first zone extends to Lyons and the second to Paris. Under these conditions the single message rates between Rome and Paris are 80 cents; between Rome and Lyons, 70 cents and between Genoa, Milan or Turin and Paris, 70 cents, a marked contrast to the high American rates. The telephone line from Paris to Rome is 980 miles long, being the longest of European telephonic lines actually in operation.

Our Roman contemporary, *l'Elettrista,* from whom we borrow these data, gives the following table of the great European telephone routes, both interior and international.

	Length in Miles.	Size of Copper Wire.
Paris-Rome	980	No. 6 B. & S.
Paris-Berlin	726	No. 6 B. & S.
Berlin-Budapest	601	No. 6 B. & S.
Paris-Marseille	542	No. 4 B. & S.
Berlin-Prague-Vienna	408	No. 6 B.
Berlin-Vienna	406	No. 6 B.
Berlin-Monaco	404	No. 6 B.
London-Glasgow (two circuits)	398	No. 3 B. & S.
Vienna-Triests	363	No. 3 B. & S.
Paris-Bonbres	289	No. 3 B. & S.
Paris-London (three circuits)	289	No. 3 B. & S.
Vienna-Prague	253	No. 3 B. & S.

The line from Paris to Rome comprises 518 miles of Italian territory, between Rome and Mont Cenis, and 468 miles in French territory, from Mont Cenis to Paris by Chambery and Lyons. In Italy the line from Rome passes Miterbe, Sienna, Florence, Bologna, Voghera, Vercelli, Turin and the Mont Cenis; 274 miles are laid along the railway track and 240 miles run across country. Over 269 miles of the route a new pole line was established, and for 240 miles existing lines have been utilized. To mitigate the effects of induction, the wires have been transposed every 3,000 feet.

The Paris-Rome telephonic route penetrates the central district of Turin, and also that of Voghera, where other important telephone lines meet—notably one to Milan, 40 miles, and one to Genoa, 96½ miles. So Voghera can place in communication Milan and Genoa with Paris, and also with Turin and Rome. Milan is, moreover, united directly with Turin by another special line of 93.6 miles, built of copper wire of No. 9 B. & S. Connection with the Paris-Rome line can also be given to Milan by this line.

The international service will be overcrowded, and it is foreseen that a single line with France will be insufficient, particularly when Turin, Milan and Genoa desire in turn to be put into communication with Lyons and Paris.

Our Italian contemporary advises that a new appropriation be speedily voted, in order to establish an additional Paris-Rome international circuit.

Italy has two other international lines which are under construction since last November; the Milan-Lugano line and that of Como-Chiasso, which assure communications with the principal Swiss villages.

ELECTRICAL MEASUREMENTS—ARTICLE III.

By Arthur Vaughan Abbott.

ELECTRICITY is so subtle and intangible that it is desirable to have instruments of the utmost sensitiveness and delicacy to achieve measurements of necessary accuracy. A crude form of galvanometer was described in the paper published last week—consider some of the refinements. When an electric current passes near a magnet, there is a mutual reaction, the conductor and magnet tending to set themselves at right angles to each other, and if either can move, motion will take place, the amount and direction of which measures the quantity and the direction of the current. It is, therefore, desirable to make measuring instruments to respond to the smallest possible current, and to be able to estimate the movement made with the greatest exactness. The galvanometer can tell two things regarding the current in any conductor; it can show which way the current is flowing, and can indicate its quantity. The rule for ascertaining the direction of the current is very simple. Suppose the wire to be stretched over the top of the suspended needle, and an observer to be lying on the wire facing the needle with his head towards the North Pole. The current which enters or is positive at the observer's head will deflect the north end of the needle towards his right hand. Theoretically it is possible to calculate the deflection of any given needle with a known current, but such calculations are so complicated and unreliable that it is usual to calibrate each instrument for itself, by comparing it with a known standard.

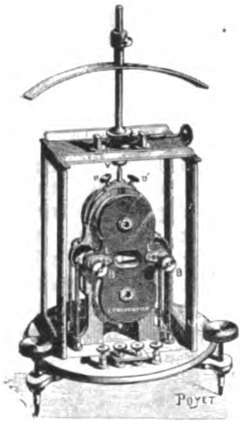


FIG. 1.

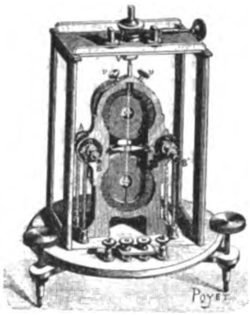


FIG. 2.

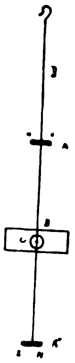


FIG. 3.

There are four methods of increasing sensitiveness: First, the magnetic needle may be made very light and small, so as to move easily; second, the position which the needle assumes is due to the magnetism of the earth. By placing another magnet near the needle, the effect of the earth's magnetism may be weakened, neutralized or reversed at pleasure; third, by coiling the conducting wire a number of times around the needle, the effect of the current is multiplied by approximately the number of turns; fourth, the method of suspension may be so designed as to reduce friction to a minimum; fifth, the indicating pointer may be made so long that extremely minute motions can readily be detected and accurately measured.

In the most sensitive instruments all these methods are combined to produce the maximum delicacy. Fig. 1 illustrates a modern galvanometer of the most delicate type. Fig. 2 shows the interior, while Fig. 3 is the needle system.

Consider how the foregoing principles are developed in this instrument. The foundation of the galvanometer consists of a substantial rubber plate, having three leveling screws whereby it can, under all circumstances, be so adjusted as to cause the needle to swing freely. On the base plate a box with glass sides is constructed to protect the delicate moving parts from dust and air currents. Inside of this box there is a kind of frame *B*, Fig. 1, made of rubber or other insulating material. In Fig. 2, one of the sides of the glass case is removed and the front of the frame work taken away, showing that it is hollow and contains two coils of wire, installed one above the other, which are connected to the binding post of the base plate outside of the case. The coils are so wound as to leave a hollow space about an inch in diameter in the center, in which two tiny magnets swing, suspended from a hook at the top of the case, arranged to be adjusted by the screw *D*, so that the needle system can be located exactly in the center of the wire coils.

The needle system is shown in detail in Fig. 3, consisting of a short piece of aluminum wire *D*, to which two pieces of watch spring *A* and *A*¹, are securely fastened. These are very small, usually not over a fraction of an inch long, one-sixteenth inch wide, and a few thousandths of an inch thick, though when magnetized they form an exceedingly powerful, yet delicate system. In the midde of the aluminum wire a very thin piece of mica *B* is cemented, which, when shut up inside of the cavity formed by the coils, acts as a kind of fan and checks the oscillation of the needle, which otherwise might become too violent, and further serves as a kind of damper, causing the needle to come to rest much sooner than it otherwise would if allowed to swing freely, thus materialy shortening the time required to make observations. At the centre of the mica vein, a small round mirror is attached, the use of which is to be presently explained.

On the question of suspension much time and thought has been expended to secure that which should be frictionless and free from any twist that would cause the needle to stop in any predetermined position. The earilest suspensions were made of a single fibre of unspun cocoon silk, obtained by soaking the cocoon in hot water, and extracting, usually with a magnifying glass, a single thread. Such suspensions are very easily repaired if broken, provided one has a silk worm cocoon, and the patience to get it to yield a single thread, for, if more than one is used, an amount of torsion is introduced that destroys much of the delicacy.

Other makers have used an exceedingly fine wire, drawn of silver and platinum, but such suspensions are less satisfactory than the raw silk, as the wire presents too much rigidity. The latest and best method involves the use of a quartz fibre. The tip of a quartz crystal is fused in an oxyhydrogen blow pipe, and, after the fashion of a glass blower, is suddenly drawn out in a long fine thread. Relatively to the silk, the quartz is much stronger and finer, and is absolutely free from all torsion. If a blow-pipe is at hand the fibres are readily made, and now-a-days most instrument makers supply quartz fibres, so that broken suspensions are easily renewed.

The closer the conducting wire is to the needle, the greater the effect of the current, and every time the wire is coiled about the needle, the effect is approximately multiplied by the number of turns; but additional turns soon produce so large a coil that the outer wire is so far removed from the needle as to be almost worthless. So by making two or more needles, and a corresponding number of coils, greater sensitiveness is obtained, by increasing the proximity of the turns to the magnetic system. This is one reason, though not the principal one, for using more than one needle.

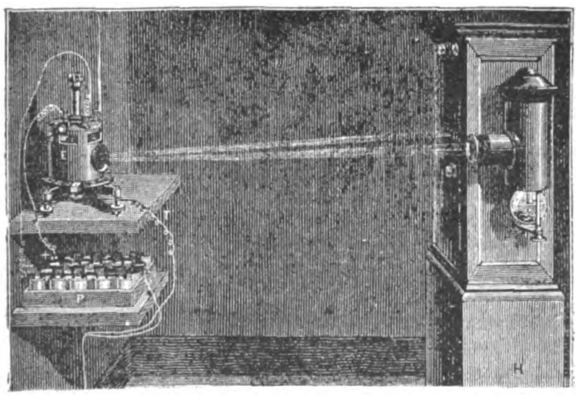
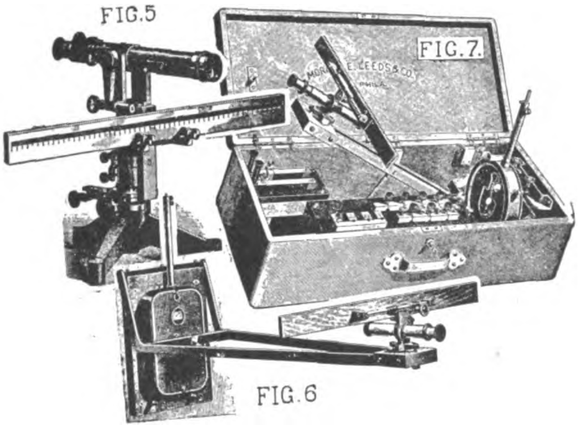


FIG. 4.

A compass needle points north because the magnetism of the earth attracts it and tends to hold it along the north and south line. The effect of the current in the wire is to oppose the magnetism of the earth, and there is evidently a conflict between the two as to the position the needle shall assume. Fig. 3 shows the needle system, composed of two bits of steel rigidly attached to the aluminum wire. Now, if the pieces of watch spring be so magnetized that the north pole of one is directly over the south pole of the other, it is evident that, in so far as the magnetism of the earth is concerned, one needle will neutralize the other, and if both were magnetized to exactly the same intensity, one would precisely balance the other, and such combination would no longer point north and south, but would rest in any accidental position. It is almost impossible either to get or to keep two needles in such an exactly balanced condition, but it is easy to make such a pair very nearly balance each other. So the effect of the earth is very greatly weakened, if not completely extinguished. Such a combination is called an *"astatic needle,"* that is, a no-position needle, or one, which, though it is a magnet, does not necessarily point north and south.

There is yet another way in which the earth's magnetism may not only be weakened or neutralized, but destroyed or reversed.



In Fig. 1, a metal rod is shown rising out of the top of the protecting case. On this rod is a curved bar, which may be adjusted either by raising or lowering it, or turning it on the rod. If this bar be magnetized, it can easily be set in such a position as to change the earth's magnetism, or overpower it to almost any desired extent.

With all the pains so far displayed in construction, nothing is apparent to enable the motion of the needle to be accurately read. In Fig. 3 a little mirror is shown attached to the mica vein. Suppose the instrument to be placed in a darkened room, and a lamp arranged to shine upon the mirror. The mirror will evidently reflect the lamp light and throw a bright spot upon the neighboring wall. If now the mirror moves, the spot of light will travel to and fro upon the wall, and by means of a scale this motion may be used to indicate the amount that the mirror swings. Fig. 4 shows the apparatus in working order. The galvanometer stands upon a shelf bolted against the wall; a shaded lamp, emitting through a slot a beam of light is arranged to fall upon the mirror, which reflects it to a scale placed upon the lamp stand, and any movement of the mirror is consequently indicated by the motion of the spot along the scale. The pointer formed by the beam of light is absolutely without weight or friction, and by setting the lamp, galvanometer and scale further and further apart, the length of this pointer may be indefinitely extended without adding in the slightest to the weight of the moving parts or the friction that accompanies them. Lastly, by the laws of reflection, the motion of the spot of light on the scale is double that of the reflecting mirror. So this instrument takes its name of *"reflecting galvanometer"* from the employment of the mirror and beam of light to register the motion of the former.

There are few instruments even of the higher astronomical order, whose sensitiveness and delicacy surpass that of the reflecting galvanometer. It is an every day matter to use one sufficiently delicate to register one billionth of the current used in an ordinary incandescent lamp.

Frequently a darkened room is an inconvenience, and then it is customary to use a telescope and scale, as is illustrated in Fig. 5. The telescope is pointed at the galvanometer, and the observer, looking through the eye-piece, sees the image of the scale that is placed directly under the telescope, reflected in the galvanometer mirror. If the mirror moves, the divisions of the scale appear to travel across the field of view of the telescope. A cross hair is stretched in the eye-piece with which the observer can read the motion of the divisions with the utmost accuracy.

Fig. 6 shows a very convenient form of reflecting galvanometer, designed for the testing room. It can be attached to a panel upon the wall, and carries a pivoted frame, supporting the telescope and scale, that can be instantly removed, if desired.

Fig. 7 is an admirably contrived portable form of instrument, arranged to be collapsable in its box, so as to be readily transported without danger of injury.

The prices of galvanometers vary very greatly. The Thompson type, shown in Figs. 1 and 2, varies from $75 to $300, dependent upon the delicacy and workmanship. Reading telescopes, similar to Fig. 5, cost from $18 to $60, dependent upon power of telescope and fineness and number of adjustments. The expense of the testing room type, Fig. 6, will vary from $25 to $50, including the telescope and scale, while the portable type, of Fig. 7, will range from $75 to $150. The form of galvanometer here described is that usually known as the "Thompson form." In a succeeding paper the D'Arsonval type will be explained.

WISCONSIN ASSOCIATION TO MEET AT MILWAUKEE

THE next meeting of the Independent Telephone Association of Wisconsin will be held at Milwaukee, February 11th and 12th. All indications give assurance of a large and successful meeting, and that the meeting last year, which was one of the largest of the various Independent State Conventions, will be easily surpassed. In Wisconsin there are about 200 Independent telephone companies, which operate some 400 exchanges, about 1,000 toll stations and have over 30,000 subscribers. With the exception of a few large cities, the field has been pretty well developed. Nearly all of this vast organization will be represented at Milwaukee.

It is expected at the meeting to complete plans for the construction of copper lines through the State. This work will be begun early in the spring.

The final program has not yet been completed, but it is known that some very interesting and instructive papers by men well equipped for their discussion, are on the list. A program is now being prepared and will be announced in a short time.

The American Telephone Journal will be represented by its Western manager, Mr. Elmer E. Smith. A full report of the proceedings will be printed in a subsequent issue, giving all details of the meeting.

LEGAL FIGHT AGAINST DISCRIMINATION.

THE Independent Telephone Companies of Tennessee have united in a fight to prevent the Cumberland Telephone and Telegraph Company from making rate discriminations and to force it to give connection over its lines to any other telephone company. A bill to bring about these ends has been introduced in the Tennessee Legislature and is being vigorously pushed.

The Independent Companies that are leading this fight are The Memphis Telephone Company of Memphis, The People's Telephone and Telegraph Company of Knoxville, and the Independent companies in Jackson, Bristol, Clarksville, McMinnville and other Tennessee towns.

The first section of the bill declares that every telephone company operating in the State is a common carrier. The second section declares it unlawful for any telephone company to discriminate in rates in towns of approximately the same size and where the conditions are practically uniform. The Cumberland Company, where competitive telephony is introduced, cuts its rates so as to drive out competition, and this is what the bill is aimed to prevent.

Section 3 of the bill puts all telephone companies operating in the States under the control of the Railway Commission, giving the latter the same powers that it exercises over railway corporations.

Section 4 deals with long distance connections, and provides that a telephone company operating in the State must give long distance connection over any of its lines to any other telephone company operating in the State, providing all reasonable regulations of the connecting lines are complied with.

Heavy penalties are provided in Section 5 for violations of any of the above provisions.

Patents

H. P. Clausen patents (No. 718,093) and assigns to the American Electric Telephone Company a telephone jack. It is a patent for jack construction and closely resembles the method of building jacks adopted by the Western Electric Company. This patent is illustrated in Fig. 1, which is self-explanatory.

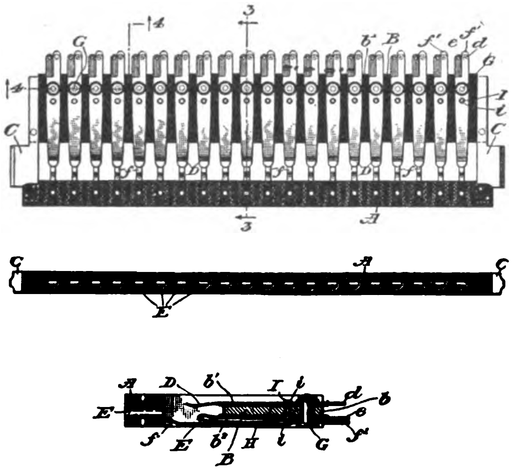


FIG. 1.

W. E. McCormick, of Chicago, patents (No. 718,371) a box for induction coils and assigns to the International Telephone Manufacturing Company. The object of this invention is merely that of designing a good and substantial box with a hinge cover, into which the induction coil can be placed, thus protecting it from injury. It is illustrated in Fig. 2.

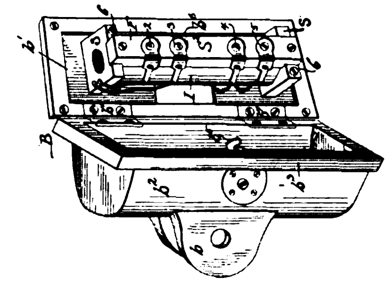


FIG. 2.

Harry L. Morse, of Boston, Mass., patents (Nos. 719,025 and 719,026) and assigns to the Chase-Shawmut Company an electric fuse or cut-out. Both of these patents relate to improvements in fuses for the protection of electrical circuits and are for the type of fuse known as the "enclosed fuse," which consists of a fusable wire, threaded through the interior of an insulating tube, which is filled with some refractory material, such as quick-lime, for the purpose of extinguishing the arc formed at the time of the rupture of the fuse. Patent No. 719,025 specifically claims the idea of a device for indicating when the fuse operates by blowing out from the end of the insulating tube an *indicating plug*. The absence of this plug indicates that the fuse is operated. Patent No. 719,026 accomplishes a similar result by drilling a hole in the insulating case, which is covered with a piece of some flexible material. When the fuse blows the force of the explosion bulges out the flexible material, thus giving an indication that the fuse is operating. These patents are illustrated in Figs. 3 and 4.

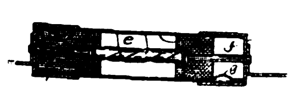


FIG. 3.

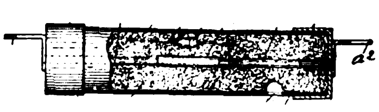


FIG. 4.

Christian Dietz, of Münich, Germany, patents (No. 719,095) a line tapping device. This is a patent to enable either a telephone or a telegraph line to be tapped easily and rapidly, as shown in Figs. 5, 6 and 7. The device consists of a rigid conductor, which is made to be telescopically collapsible, very much after the plan of the old bamboo fishing rods. In the base of this conductor is a reel, *c*, which is kept under tension by means of a spiral spring, *f*. On the exterior of this reel a flexible conductor is wound that passes down to the center of the collapsible rod. Upon the end of the rod there are two hooks, *u* and *v*, one of which is in electrical communication with the rod and the other with the flexible conductor.

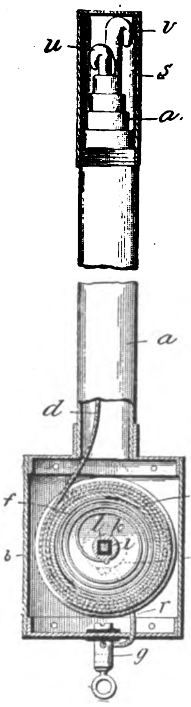


FIG. 5.

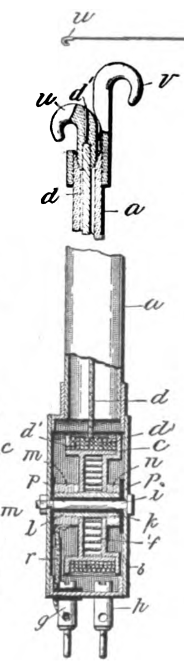


FIG. 6.

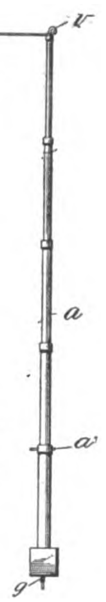


FIG. 7.

On the base of the box carrying the reel are binding posts, *g* and *h*, which are in corresponding electrical communication, respectively with the flexible conductor and the rod. It is obvious that an instrument of this kind can be carried in the pocket when folded up, extended at pleasure, and by means of the hooks connected with a telephone or telegraph line, while the terminals of the receiving instrument may be inserted in binding post, *g* and *h*.

William Höhne, of Schöneberg, Germany, patents (No. 719,219) a new form of telephone system. Mr. Höhne's idea is to develop a circuit so that when the connecting plugs have not been removed from subscribers' jacks the doubling of connections to other subscribers may be avoided. The circuit is illustrated in Fig. 8, in which three stations are shown to accomplish this object. The telephone system comprises a line wire for each station, a call bell for each station, a line wire for each call bell, a common return wire for the station line wires and connecting bell wires and a battery between the common return wire and the conductors connecting the call bells. By means of the figure the circuits of this system may be traced out.

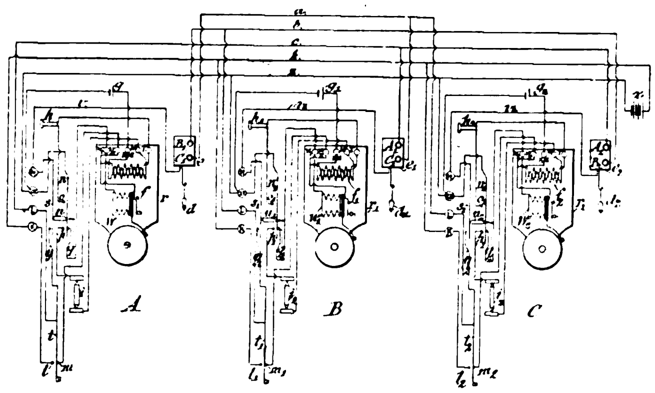


FIG. 8.

The Week's Messages.

NEW COMPANIES

BATESVILLE, ARK.—The Newark Telephone Company of Batesville has filed articles of incorporation with the Secretary of State. The capital stock is $10,000, of which $5,000 has been subscribed. C. J. Magness is president, J. S. Handford vice-president and treasurer, and J. C. Yancey, secretary.

LAKE CITY, FLA.—D. E. Whetstone, R. W. Adams and others have incorporated the Whetstone Telephone Company, having a capital stock of $10,000 for constructing a system from Lake City to Jasper.

TITUSVILLE, FLA.—The Indian River Telephone Company has been incorporated with a capital stock of $5,000. The line will extend from Titusville to Miami. Incorporators: W. H. Harris, H. Jennings, of Tibbals; Geo. E. Coon, Jensen, and A. C. Dittmar, and C. S. Tucker, of Fort Pierce.

TENNESSEE, ILL.—The Tennessee and Manoine Telephone Company No. 3 has been organized. Officers: Isaac Griffith, president; J. R. Stookey, secretary; A. C. Payne, treasurer.

CORYDON, IND.—A number of business men of Corydon have organized the Independent Telephone and Telegraph Company, and have filed articles of incorporation, with a capital stock of $10,000. The object of the company is to operate a central energy system exchange at Corydon, and put in a complete system in Harrison county, consolidating all the Independent systems under one exchange, and competing actively with the Cumberland Telephone Company. It is said the system will be in operation within ninety days.

RILEY, IND.—The Union Telephone Company has been incorporated to operate a telephone line in Clay and Vigo counties. It is capitalized at $2,400. The incorporators are: John Schimerer, Christopher Fox, Henry Lee, Charles G. Rector, Edward Carolt, E. O. Rector, Warren Light, W. W. Rhodes, Ray Lee, C. J. Aspurger, Howard Jeffers, B. Bradfield, C. D. Fagin, Homer Mills, James T. Dailey, Reuben Brown, Louis Primmer, John Fox, J. S. Whitacre, Isaac Kutz, Frank Senour, William Jackson, Fred. Fox and Chacey Foulk, all of Riley, Ind.; Adam S. Robertson, Warren O. Rector and John M. Rector, of Cory, Ind.; Wallace Collins, of Terre Haute, and H. J. Felling, of Lost Creek.

SALEM, IND.—The Salem Co-operative Telephone Company has been incorporated with a capital stock of $600. The incorporators are W. K. Pierce, F. M. Jeffers, F. M. Buskirk.

BAINE, IA.—The Farmers' Mutual Telephone Company of Baine, Wright County, has been incorporated. The capital is $3,000. Fleming Evans and others are the incorporators.

LE MARS, IA.—The Le Mars Telephone Company will soon be incorporated with a capital stock of $80,000. It has already asked for a franchise here.

MARNE, IA.—The Marne and Elkhorn Telephone Company, of Rorbeck, has been incorporated with a capital stock of $5,000.

WATERLOO, IA.—The Commonwealth Telephone Company has been incorporated with a capital stock of $900,000. The incorporators are C. H. Geist, A. G. Wheeler, Jr., treasurer of the Automatic Electric Company, Chicago, and others. The principal place of business will be Waterloo. This company has purchased the following companies: The Cedar Valley Telephone Company, the County Telegraph and Telephone Company, the Waverly Telephone system, the Hardin County Telephone system, the Parkersburg Telephone Company, the LaPorte City Telephone system. It is claimed the Commonwealth Company will install the Strowger automatic system in the cities supplied by these companies.

BETHLEHEM, KY.—The Home Telephone Company has been organized here by Charles Lanz, with a capital stock of $75,000.

MT. STERLING, KY.—The Eastern Kentucky Telephone and Telegraph Company has been incorporated with a capital stock of $25,000.

CLEARWATER, MINN.—The Clearwater Telephone Company has been organized, to be incorporated with $10,000 capital stock. Officers: G. P. Boutwell, president, Clearwater; W. F. Shattuck, vice-president, Harty; Walter Franzen, secretary, Silver Creek; Charles Whittemore, treasurer, Clearwater. W. H. Cutting, Buffalo, Minn., was named as attorney. The first line to be built is from Clearwater to Silver Creek, ten miles.

NORWOOD, MINN.—The Norwood Young America Telephone Company has been organized at Norwood. The following were elected officers for the first year: J. D. Krause, president; Aug. F. Truwe, vice-president; E. G. Robinson, secretary; George Bradley, treasurer; directors, John H. Rausch, F. S. Mayer, A. J. Truwe, J. W. Craven, H. F. Lueders, W. G. Fabel, George W. Ocobock. Construction work will commence as soon as the weather permits.

JACKSON, MISS.—The Rural Telephone and Telegraph Company of Pomola County has been incorporated with a capital stock of $5,000.

BARKER, N. Y.—The Niagara Telephone Company of Barker has been incorporated with a capital stock of $10,000. Directors: Elmer W. Porter, Ella E. Porter and John O'Malley, of Barker.

BOVINA, N. Y.—The Bovina and Roxbury Telephone Company, of Bovina, has been incorporated; capital, $600. Directors: A. J. Thomson, J. N. Thomson and Andrew Cowan, of New Kingston.

DRYDEN, N. Y.—A number of farmers of Dryden are planning a telephone company, whose lines will cover this vicinity and connect all the farms in this section with the village. E. Dedrick, Webb Corbin, H. C. Loomis and Charles Pratt have looked the ground over carefully and have assurances of patronage sufficient to form a company.

GREENRIVER, N. Y.—A meeting of residents of Greenriver and Austerlitz was held recently, for the purpose of organizing a Co-operative Telephone Company to erect a line from Greenriver to Chatham via Austerlitz and Spencertown. The following were chosen as a committee to solicit subscribers: E. H. Harvey, Dennis Herron and James J. Dunn.

WOLCOTT, N. Y.—E. T. Phillips and Arthur Fish of this village, are making a canvass to secure subscribers to a telephone line which they will construct from Wolcott to Desbrough park, Port bay; thence to North Wolcott, and back to Wolcott by another road. Another line will be from Wolcott to Butler Center and South Butler.

UTICA, OHIO.—The Utica and Homer Telephone Company, of Utica, has been incorporated with a capital stock of $40,000, by Dwight E. Sapp, Frank L. Beam, Harry C. Devin, R. M. Greer and Wm. C. Sapp.

VIBORG, S. D.—Articles of incorporation have been filed for the Viborg & Centerpoint Telephone Company, with a capital stock of $10,000. President, M. V. Olsen; Secretary, F. L. Larson.

ROSALIA, WASH.—The Rosalia Telephone Company has been organized with a capital stock of $3,600. Directors: H. M. Roberts, R. P. Tumbley, M. W. Merritt, F. J. Wilmer, A. J. Stone, F. M. Campbell, R. J. Fick.

FAIRMONT, W. VA.—The Fairmont Telephone Company, has been incorporated with a capital stock of $25,000. The incorporators are: C. L. Michael, F. P. Kelley, M. M. Ogden, C. W. Arnett, S. B. Harr.

NORTH BALTIMORE, W. VA.—The North Baltimore Home Telephone Company, capital stock of $25,000. Incorporators: Carry B. Close, F. M. Dotson, Samuel Wyant, Claude Wyant, C. F. M. Miles, Toledo.

FINANCIAL.

BLOOMFIELD, IND.—The Home Telephone Company proposes to reorganize with an increased capital of $100,000.

PRINCETON, IND.—The Princeton Telephone Company has sold $15,000 worth of stock at the par value of $100 a share. When this company was chartered the capital stock was placed at $25,000, but only $10,000 was paid up. This new issue brings the capitalization up to $25,000, and

THE WEEK'S MESSAGES—Continued.

places the company on a sound financial footing. The company will connect toll lines with Vincennes at White River, taking in the towns of Hazelton and Patoka en route. At each of these places, a branch office will be installed. An Independent line running west of Patoka, and now sub-licensed by the Bell, is to be absorbed. Another toll line will connect with the proposed new municipal plant at Evansville, 37 miles distant. The company already has splendid toll facilities with Independent companies all over the country, the main branches being Owensville, Oakland City, Wabash, Haubstadt, Fort Branch, Cynthiana, Mackey Station and Francisco. The company will vacate its present quarters as soon as the new brick building is finished. A new scitchboard and 1,000 new telephones will be installed. The company holds a fifty year franchise here, while the Bell Company's franchise only runs for ten years, and will soon expire.

RICHWOOD, OHIO.—The Richwood Telephone Company has increased its capital stock from $10,000 to $20,000.

ERIE, PA.—A mortgage for $200,000 has been recorded, made by the Union Telephone and Telegraph Company to the Dime Savings and Trust Company of Erie, and is given to secure funds for big improvements of the company.

HILLSBORO, PA.—Secretary H. P. Morrow, of the Hillsboro Telephone Company, has issued his statement of the condition of the company. It shows that the capital stock paid in is $13,537.50. Rentals were $4,300.02, tolls $574.58, and bills collectable are $5,300. For construction $21,052.79, and $2,650.58 were paid. The company has 108 telephones in business houses, and 253 in residences.

ELECTIONS.

ROCKFORD, ILL.—At a meeting of the stockholders of the Home Telephone Company, the following directors were re-elected for a term of one year: H. H. Clough, R. N. Baylies, E. W. Brown, Bethune Duffield, of Detroit, Mich., H. F. Forbes, F. H. Worthington and W. G. Sharp of Elyria, Ohio. Reports of the work done since the organization of the company greatly pleased the directors, and they at once voted to put in 500 additional telephones, which will give a capacity of 2,000 lines. The company now has 1,285 instruments in actual service. The following officers were elected at the directors' meeting: President, E. W. Brown; vice-president, H. H. Clough; secretary, John Camlin; treasurer, F. F. Wormwood.

PRINCETON, IND.—The Princeton Home Telephone Company at its annual meeting of stockholders, elected the following officers R. M. Parrett, president and general manager, Dr. G. V. W. Trippett, vice-president, Mr. Stevens, assistant manager and treasurer. Directors: William Stillwell, Dr. G. V. W. Trippett, J. W. Ewing, Leo Gudgel, Aaron Trippett, R. M. Parrett, Mr. Stevens and G. Kusel, representing the Eureka Electric Company of Chicago.

VERNON, IND.—The stockholders of the Naylor and Vernon Telephone Company of Vernon, have organized by the election of the following officers: President, W. R. Nailor; secretary, C. L. King; treasurer, M. Crosby.

BOONE, IA.—The Boone County Telephone Company at its annual meeting re-elected the board of directors of last year. The members of the board are E. O. Montgomery, S. O. Stockslager, O. C. Herman, F. L. Goeppinger and Geo. I. Miller. The board has been reorganized, Mr. Montgomery being elected president to succeed Geo. I. Miller. Mr. Herman was elected secretary. C. C. Deering will no doubt be re-elected manager unless he should conclude to go to Des Moines as manager of the Mutual. Manager Deering's report shows the past year to have been the best year in the history of the company. The stockholders discussed the proposition to consolidate with the Des Moines Mutual and other toll lines, and are favorably inclined towards the scheme. The company is seriously contemplating a raise in rentals in Boone. It is also reported that the Iowa company, which has an exchange here, will raise its rentals in the near future.

CRESTON, IA.—The Creston Mutual Telephone Company added about 100 telephones during the year to its lines, repaired and improved the lines, remodeled its offices and secured new switchboards and connections, and kept up the regular running expenses of the company, and at its annual meeting declared a dividend of 7 per cent. on the capital stock for the year. C. C. Boys was elected president, and George A. Atkinson secretary of the company, which now has ten rural lines running into its contral office.

DES MOINES, IA.—At the meeting of the Mutual Telephone company's new board of directors, new officers were elected, the finanical condition of the company was discussed, and it was decided to take under consideration plans to be devised by the executive committee to finance the concern, on a basis of an investment of $125,000 to $175,000. J. W. Hill was elected president; J. S. Bellamy of Knoxville, vice-president; J. C. Hume, of Des Moines, secretary; L. M. Grimes of Des Moines, treasurer. The office of general manager was abolished, for the present, and the resignation of George N. Bandy, to take effect February 1, was received and accepted. It was decided to choose a superintendent, who shall have general charge of the work of the company under the direction of an executive committee. It is very probable that the company will shortly install a new multiple switchboard, construct a new exchange building, and make all circuits full metallic.

PORTLAND, ME.—At the annual meeting of the Northeastern Telephone Company, the following were elected directors: Thomas R. Brooks, Edwin W. Gearhart, Lewis A. Goudy, R. G. Brooks, Melville H. Kelley. The directors subsequently organized with the following officers: President, Thomas R. Brooks; vice-president, Lewis A. Goudy; treasurer, Edwin W. Gearhart; clerk, Oscar H. Hersey.

SHELBY, MICH.—At the annual meeting of the Oceana County Telephone Company, the following officers were elected for the ensuing year: President, H. S. Newton; vice-president, G. T. Sands; secretary and treasurer, G. S. Root; treasurer, L. P. Hyde. Directors: E. S. Palmiter, George Hawley, C. L. Churchill, A. E. Sonter, W. L. Stoddard. By vote of the stockholders it was decided to increase the capital stock from $20,000 to $50,000.

MIDDLETOWN, N. Y.—The directors of the Orange County Telephone Company have elected the following officers: President, Charles Higham; vice-president, A. B. Wilbur; treasurer, S. A. Bull; secretary, W. A. Marshall. Executive Committee: J. B. Carson, A. B. Wilbur, Leander Brink, Archibald Taylor, John McWilliams. Auditing Committee—S. A. Bull, W. C. Ramsdell, J. W. Tompkins. Purchasing Committee: M. B. Wolf, Chas. Higham, A. B. Wilbur.

NEW BERLIN, N. Y.—The New Berlin Telephone Company has reelected its board of directors. The following officers have been elected: President and manager, F. A. Smith; vice-president, I. L. Richer; secretary and treasurer, G. H. Willard. The exchange now numbers about 100 subscribers, and the party lines in the country are well patronized by the farmers. The company has made arrangements with the new Home Telephone Company of Utica, and as soon as the weather will permit, will begin building the remaining five miles between Bridgewater and Cassville necessary to connect with that system.

DAYTON, PA.—The stockholders of the Armstrong Telephone Company elected the old officers, with the exception of two of the auditors. President, A. K. Goodhart; vice-president, A. Good; secretary, J. B. Good; treasurer, W. C. Marshall; managers, John W. Lias, A. K. Good, Dr. G. S. Morrow, M. L. McIntire, I. H. Foster; auditors, S. W. Marshall, G. W. Beck, L. A. Russell.

PARKERSBURG, W. VA.—At a meeting of the stockholders of the West Virginia Western Telephone Company, the following board of directors was elected. H. C. Henderson, R. H. Brown, C. E. Haddox, J. E. Carle, A. C. Davis, R. H. Rutherford, J. P. Sharp, J. F. Dowd and J. H. Lininger. The following officers were elected by the board: President, H. C. Henderson, Williamstown; vice-president, J. C. Carle, Eatons, general superintendent and office manager; A. C. Davis, Parkersburg, secretary; J. H. Lininger, Harrisville, treasurer; F. P. Moats, Parkersburg, attorney; J. F. Dowd, Parkersburg.

COMPETITION.

HAZLETON, IND.—At a recent meeting of the Business Men's Association, it was decided, in view of the increase of rates announced by the Bell Company here, to withdraw patronage from the Bell Company in favor of the Home Company.

WESTERLY, R. I.—The first engagement between the telephone interests in Westerly took place at the regular session of the Town Council recently and was an unqualified victory of the Westerly Automatic Telephone Company over its rival, the Providence Telephone Company. Both companies sought permission to set poles from Westerly to Watch Hill, along the shore road to Weekapaug, and from Westerly to Potter Hill and Niantic. At present Niantic and Weekapaug, although only six miles distant from town, are not in the telephone zone at all. First, the petition of the Automatic company was granted. Then it was moved that the petition of the Providence company be granted. This motion was not seconded, but another was offered, giving the Providence company the right to use the poles of the Automatic company. This, the latter's officials was ready to allow, but the Providence corporation refused, and that ended the matter. Meanwhile the residents of Pawcatuck are troubled over the question, for those who have in use instruments of the Southern New England Telephone Company have been notified that after February 1 it will evacuate the territory, and hand it over to the Providence company. Where they now pay five cents to telephone to New London, Stonington or Mystic, and 25 cents to any part of the State, they expect to pay from 20 cents to 75 cents or a dollar for the same service.

APPLETON, WIS.—Outagamie County Supervisors in official session set a precedent in awarding the county telephone contract for two years. The Fox River Telephone Company, whose instruments are now in the county buildings, made a bid of $126. The Wisconsin Bell Telephone Company offered to duplicate the service for $84. However, the board voted to encourage the Independent company by giving it the contract, even though its price is the highest.

THE WEEK'S MESSAGES—Continued.

COMBINATIONS.

ALMA, KAN.—The McMahon Independent telephone system has been sold to a company composed of local business men. The new owners take possession of the property at once. The property conveyed consists of the exchanges at Alma and Eskridge of over 100 telephones each and about 100 miles of toll lines.

EUREKA, KAN.—C. N. Penwell has sold his telephone system to Brinkerhoff & Edwards, of the Eureka Light and Power plant.

OSBORNE, KAN.—M. W. Hardman and H. H. Welty, of Downs, have sold their long distance telephone system covering the country from Downs to Plainville, Lenora, Phillipsburg and Norton, and their local exchanges at Phillipsburg and Downs to an Osborne company, composed of C. W. Landis, J. R. Loomis, Chan. Baldwin of Osborne, and C. S. Dittman, of Downs. This new company expects to extend the line until all of the towns of northwest Kansas are brought into speaking distance.

ONEONTA, N. Y.—The Oneonta Telephone Company has purchased the lines of the Milford Telephone Company. The Milford company owned the Independent line from Cooperstown to Oneonta, with branches to Toddsville and Phoenix Mills. The line includes many subscribers between the places named.

NEW CONCORD, OHIO.—The New Concord Telephone Company has been purchased by S. C. Hardman, of Rix Mills, Ohio. He will incorporate the company, which has ninety subscribers, and seek to develop the field in this neighborhood.

NEW ALBANY, TENN.—The Home Telephone Company has filed a deed conveying to the Independent Long Distance Telephone Company of Louisville its lines between this city and Greenville and Sellersburg and between Corydon and Milltown, reserving the right to use the poles for desired connections.

FRANCHISES.

EUREKA SPRINGS, ARK.—A franchise to construct a telephone system has been granted the Citizens' Electric Company, W. W. Duncan, president.

CHICAGO, ILL.—At a recent meeting the Chicago City Council ordered deferred and published an order giving the United Telegraph, Telephone and Electric Company, a Hyde Park corporation, the right to lay in the city conduits a cable of conductors connecting its Hyde Park plant with the downtown district. The order gives the corporation the temporary privilege, pending the disposition of an ordinance now before the council, permitting it to install an underground cable containing not more than ten conductors, for establishing connection with the downtown district.

SIOUX CITY, IA.—The Municipal League of Sioux City is endeavoring to have the following provisions incorporated in the franchise asked for by the Tri-State Telephone Company: "A certain fixed percentage of the gross earnings of the telephone company shall be paid into the city treasury each year. Provision shall be made for the purchase of the system by the city at the expiration of a limited period by the city paying a fair cash value for the tangible property of the company. Provision shall be made requiring the company to connect with all telephone systems outside of Sioux City which may want to have connection with Sioux City."

PITTSFIELD, MASS.—The selectmen have granted the Rural Telephone Company of West Stockbridge Center a franchise over the highways from the town line at Alford to State Line. They reserved their decision on the petition of the Village Telephone Company for a franchise over the highways from State Line to West Stockbridge village and south on the Great Barrington road to the town line of Great Barrington, when they may connect with a similar line from that town.

MONROE, MICH.—The Home Telephone Company of Monroe has applied to the council for a franchise. Toledo capital is back of the new company. The rates will be $24 for business and $18 for residences, a reduction of $4 from the Michigan Telephone Company's present rates. It is said the Strowger automatic system will be installed.

LINCOLN, NEB.—The Independent telephone companies of the State have had a bill introduced in the Legislature giving them the right to construct toll lines and install toll stations in all cities, towns and counties in the State.

LINCOLN, NEB.—The Plattsmouth Independent Telephone Company has asked for a franchise to establish a toll station here.

CLAYTON, N. J.—The Eastern Telephone Company will apply for a franchise at the next meeting of the city council.

WOODSTOWN, N. J.—The Eastern Telephone Company of Camden, has asked for a franchise at Woodstown.

BERGEN, N. Y.—The town council has granted a franchise to the Bergen Telephone Company to construct and maintain a telephone system.

LANCASTER, N. Y.—The board of trustees of Lancaster has granted permission to the Interocean Telephone Company to operate its system in the village.

MIDDLETOWN, OHIO.—The Hamilton Home Telephone Company of Hamilton will ask for a franchise here.

OTTAWA, OHIO.—The Farmers' Home and Country Telephone Company has been granted a franchise by the village council for the construction of a telephone system.

PROSPECT, OHIO.—The Marion County Telephone Company recently applied for a franchise in this city. The council refused to consider the franchise, and the company carried the matter to court. The latter has just rendered a decision that it is within its province to grant a franchise and it will do so as soon as one can be prepared.

McKINNEY, TEX.—At a meeting of the city council Mr. Duffey, president of the Grayson County Telephone Company, applied for a franchise to put in a new up-to-date telephone system here. The application will be acted upon at the next meeting. It is intended to begin work on the system as soon as the franchise is granted.

UNDERGROUND

COUNCIL BLUFFS, IA.—The city council has passed the ordinance compelling telephone wires to be put underground in a certain section of the city before August 1, 1904.

TRENTON, N. J.—The city has decided to issue bonds for the purpose of placing all wires owned by the corporation underground.

AKRON, OHIO.—The Akron People's Telephone Company has decided to lay all of its wires as far as possible underground. The company will lay about a mile of underground cable each year until the work is completed.

DAYTON, OHIO.—The Home Telephone Company will install conduits on the new bridge.

CONSTRUCTION.

CATLETT, GA.—Dr. Alsobrooks, of Wood Station, was here recently relative to running the telephone line from Wood Station to this place, and there is some talk of it being extended from here to La Fayette.

ROCKFORD, ILL.—The Lee County Telephone Company is installing a new toll line switchboard. It has four toll lines and 12 farmers' lines which will be centered in the new switchboard.

FAIRMOUNT, IND.—The new Citizens' Telephone Company has received a consignment of 1,000 poles which will be used in the construction of its lines. The new switchboard is also on hand and is being placed in position.

NEW HAVEN, IND.—Active work on the New Haven telephone plant, recently purchased by the National Telephone Company, has been commenced. W. L. Moellering will go to Chicago soon to purchase a switchboard.

VINCENNES, IND.—The Knox County Home Telephone Company is preparing to extend a toll line south through the farming section of the county to Decker Station. The line will connect with the new Princeton and Evansville toll lines at that point.

SABULA, IA.—The stockholders of the Sabula Telephone Company have decided to run a direct line from the switchboard at Haines to the central office at Miles. No other instruments will be connected with this line, and it will be used exclusively for through business between the Miles and Sabula lines. The Sabula company has made connections with Green Island. It now has a total of almost 100 instruments installed.

THORNTON, IA.—The construction of a local telephone system is contemplated by D. U. Parks, Hampton, Ia.

DODGE CITY, KAN.—The Dodge City Telephone Company is making arrangements for stringing over one thousand feet of paper insulated cable. The company has added twenty-five new subscribers to its list during the past month.

LARNED, KAN.—The Rock Telephone Company contemplates extending its lines southward to St. John, Seward and Belepre during the spring. About 50 miles of line will be built, if the plan is carried out.

STOCKTON, KAN.—The Stockton Telephone exchange will soon construct 20 miles of party lines and 70 miles of toll lines.

STOCKTON, KAN.—The Stockton Telephone Company is installing a new switchboard in its exchange in this city. The new board will have an ultimate capacity of 200 lines.

ADRIAN, MICH.—The Adrian Telephone Company is putting in a new exchange at Cadmus. Forty telephones have been contracted for, and it is expected that 100 will be secured, which will cover more than half of Dover township.

AMBOY, MINN.—The Sterling-Amboy Telephone Company and the Willow Creek Telephone Company have agreed to install and maintain a central office in Amboy on equal shares. Subscribers renting telephones of either company will have free service over both systems.

GLENCOE, MINN.—The Glencoe telephone exchange, under the management of J. J. Greaves, proposes installing exchanges in several nearby towns, among which may be mentioned one at Lester Prairie, connecting up Lester Prairie, New Germany and Winsted, and one at Norwood.

THE WEEK'S MESSAGES—Continued

CHILLICOTHE, MO.—J. L. Boyle, who operates about fifty miles of long distance telephone wires through his switchboard in Jackson township, will construct a direct line from Chilicothe to his home. The new line will be about nine miles in length.

WEBER, MO.—The Lindale Telephone Company, which operates a line between here and Sellers, will construct a line to La Grange as soon as the weather permits. Many farmers along the line will subscribe for instruments.

CHATHAM, N. Y.—The West Ghent Co-operative telephone line, which runs from Hudson, Stottville, and Stockport, is to be extended to Ghent depot and a line is to be built from Chatham to Ghent, connecting the two systems.

FULTON, N. Y.—The Fulton Telephone Company will soon improve its local system in conformity with the work done in Oswego by the Ontario company. The lines are to be extended from this city to Syracuse and from Oswego to Watertown.

JAMESTOWN, N. Y.—The board of directors of the Home Telephone Company have inspected and accepted the new exchange. In a short time the company will instal a selective system. The Chautauqua Telephone and Telegraph Company, which has headquarters in this city, has just completed the installation of an exchange at Kennedy. This exchange has connection with nearly all of the residents of the vicinity and the exchange in connection with Jamestown and the lines of the Interocean Telephone and Telegraph Company is connected with nearly all of the towns of the county. The company has under construction a number of exchanges in other towns of the county.

JEFFERSONVILLE, N. Y.—W. H. Lawrence, of this place, who controls the telephone lines from here to Kenoza Lake and Callicoon, says he will construct lines from here to Youngsville and North Branch as soon as the weather permits, and may extend to Callicoon Depot.

SPRINGWATER, N. Y.—The Springwater Telephone Company will extend its lines to Scottsburg in the spring. The Canadice line will also be extended to Ball Hill.

TONAWANDA, N. Y.—The International Traction Company will install a telephone system for car dispatching and emergency service on its Lockport and Kenmore lines.

KENMARE, N. D.—A scheme is on foot for the erection of a telephone line from here to Newport. Dr. Fawcett is behind the scheme, and it is intended to take a number of other small towns into the circuit.

FINDLAY, OHIO.—The Home Telephone Company has been granted a franchise to operate a system at Bloomdale, and work will be commenced at once in the construction of the exchange and various lines.

HONESDALE, PA.—The Citizens' Telephone Company will commence the rebuilding of its line in Honesdale in a few days. It is to be put in first class condition.

WEST BRANCH, PA.—The West Branch Telephone Company has decided to extend its telephone line from Montoursville to Loyalsockville, and the residents of Fairfield Centre and Huntersville will construct a private line to connect with the West Branch line at Farragut. This extension will connect Huntersville, Fairfield Centre, Farragut, Loyalsockville and Warrensville with surrounding towns. Work will be commenced as soon as the weather will permit.

MURFREESBORO, TENN.—L. S. Ashton, of Toledo, Ohio, representing Ohio capitalists, was here recently for the purpose of installing an Independent telephone plant in the city.

COLMESNEIL, TEX.—L. F. Fulgham, who runs the local telephone exchange at this place, is putting in a private line from here to Town Bluff. Mr. Brown, who owns the exchange at Jasper, will put in a line, connecting with the Fulgham line at that place.

GAINESVILLE, TEXAS.—F. B. McElroy, to whom the city recently granted a franchise for a telephone exchange, will be in the city a short time to arrange the final details necessary to the construction of the telephone line.

FARMVILLE, VA.—The Union Telephone Company is now erecting poles from Darlington Heights, Five Forks and Prospect, on to Farmville. It is intended by this company to continue the system on through the eastern and northeastern sections of Prince Edward.

SEATTLE, WASH.—The Seattle Telephone Company will soon extend its system in this city in order to handle the increased business. S. B. Claypool is manager.

MERRILL, WIS.—The Merrill Telephone Company has decided to reconstruct its entire system, which is said to mean an outlay of from $15,000 to $20,000.

MISCELLANEOUS

AURORA, ILL.—The People's Telephone Association of Indiana, recently incorporated with a capital of $10,000, will operate in Dearborn, Ohio, Franklin and Switzerland counties.

KEWANEE, ILL.—September 1, 1903, is the time when the new telephone system of the American Electric Telephone Company will be in operation in Kewanee, according to H. C. Dodge, the representative of the company, who has had charge of the preliminary work here, in connection with securing a franchise. Mr. Dodge says that work on the lines will begin just as soon as the weather permits and that with four months of uninterrupted labor the system will be ready for operation. This may bring the opening of the exchange before the first of September, but it is necessary that there be 450 subscribers before charges are made to any one, so some little time may be required to swell the list to this number after the start has been made. Mr. Dodge, however, does not look for much, if any, delay on this score, as he already has 250 subscribers guaranteed and has thus far made only a superficial canvass. He has been through the business district where he secured nearly all the merchants, but has not yet made any attempt to obtain the signatures of people having telephones in their residences. Mr. Dodge says he has completed arrangements whereby the exchange here will have connection with the trunk lines of the Inter-State Telephone Company, the nearest lines of which are now within about thirty miles of Kewanee.

INDIANAPOLIS, IND.—The New Long Distance Telephone Company stockholders have organized a voting trust, to continue for five years. The purpose of the trust, as outlined by S. P. Sheerin, president of the company, is to continue the present management for a term of five years, and to insure the continuance of what has always been the policy of the company—that of treating all stockholders, large and small, exactly in the same way, so far as the value of their stock is concerned.

MUNCIE, IND.—The annual meeting of the Delaware & Madison Telephone Company will be held Feb. 9.

SOUTH BEND, IND.—The Home Telephone Company's exchange at South Bend, established in October, already has nearly 1,500 telephones and continues to grow at a remarkable pace.

TERRE HAUTE, IND.—The Kinloch Telephone Company, of St. Louis, has made connection with Terre Haute on its long-distance line, which connects St. Louis with the Indiana system of Independent exchanges.

DES MOINES, IA.—J. W. Hill has resigned as president of the Mutual Telephone Company, being succeeded by Vice-President J. S. Bellamy. The latter has announced an executive committee as follows: J. W. Hill, F. C. Hubbell, E. H. Martin, M. McFarlin, J. S. Bellamy. A committee on finance was also appointed, consisting of Clyde Brenton, J. D. Whisenand and F. C. Hubbell.

WATERLOO, IA.—The Rapid Transit Independent telephone line is now completed to Waverly, Sumner, Tripoli, Denver, Glasgow, Cedar Falls, Waterloo, making a complete circle.

MARSHALL, MICH.—An agreement has been reached between the Marshall Telephone Company and Dr. F. M. Foote, which will enable all on the latter line to reach any person in Marshall. The Independent Company has nearly three hundred telephones in operation in the city, and many more have been ordered in. The State service is excellent and is more in demand than the Bell line.

BALTIMORE, MD.—The Maryland Telephone and Telegraph Company has opened its line to Philadelphia. This long-distance service is over the Maryland Company's line to the State boundary, where it meets the Delaware Long-Distance Company's line, which company the Maryland controls. This takes it to Marcus Hook, Pa., where the lines of the Keystone State Long-Distance Company are met. Connections are also secured with a rapidly extending long-distance service which is to gridiron the States of Pennsylvania and New Jersey. The Maryland Company has established toll stations along the route between Baltimore and the northern terminus of its lines and the lines it controls.

HIGHLAND, MO.—The Highland Telephone Company has greatly improved its service at this place.

WARWICK, N. J.—J. Wallace Gordon and P. G. Wagner, directors of the Port Jervis Telephone Company, were at Warwick recently in conference with the local telephone managers of Sussex and Orange counties, looking toward a more general local exchange and connections and future long-distance connection.

CLINTON, N. Y.—The Utica Home Telephone Company's new line will shortly be completed as far as Clinton, and by the middle of next month it is expected to have the line in operation in connection with its exchange in Utica, where it has contracts for 1,500 telephones. The rate for connection from Clinton to Utica will then be 10 cents, as against the extortionate charge of 20 cents heretofore prevailing, and the service promises to be first-class.

FREEPORT, L. I., N. Y.—The Village Board has received a communication from the South Shore Telephone Company in relation to resetting of poles, and offering better terms to the village than those made by the New York and New Jersey Telephone Company. The matter was placed on file.

THE WEEK'S MESSAGES—Concluded.

HERKIMER, N. Y.—The County Telephone Company, with headquarters here, has had a wonderful increase in business during the year 1902. It installed 350 telephones during the year, and has now in operation in Herkimer, Mohawk, Ilion and Frankfort and the subsidiary lines running to those places a total of 1,225 telephones.

HOOSICK FALLS, N. Y.—The Eastern New York Telegraph and Telephone Company of Hoosick Falls, N. Y., has made a five years' contract with the Rensselaer Telephone Company of Troy, for the interchange of toll business. Efforts are being made to have connections in readiness by February 13.

ATHENS, OHIO.—The Athens county Telephone Company is installing a new switchboard here. In last week's AMERICAN TELEPHONE JOURNAL it was stated that this was the Citizens' Telephone Company.

SALIX, PA.—The Salix Telephone Company has completed a line to Foustwell.

PERSONAL

NORWALK, OHIO.—Manager C. L. Howk, of the People's Telephone Company, at Shelby, has resigned his position. He will have charge of the Norwalk exchange.

TRADE NOTES

THE AMERICAN ELECTRIC TELEPHONE COMPANY, Chicago, has notified Purdue University, at La Fayette, Ind., that it has shipped a quantity of apparatus to be used in the experimental work in the telephone department.

THE FISK-NEWHALL TELEPHONE MANUFACTURING COMPANY, Chicago, has just issued its first catalogue. The catalogue is gotten up in first-class shape and contains thirty-two pages, profusely illustrated with half tones of the products of the company's manufacturing plant.

THE W. G. NAGEL ELECTRIC COMPANY, Toledo, Ohio, is making a complete line of construction tools, using only the best material throughout, and is finding a ready sale on this line of "Ready" Specialties. It describes the line in Bulletin No. 5, which will be mailed upon application.

WM. F. HOFFMAN, formerly of Detroit, Mich., where he held the position of general foreman for the Michigan Telephone Company, and late foreman of the Mechanical Department of the Citizens' Telephone Company, of Grand Rapids, is now superintendent for Frank B. Cook, Chicago, manufacturer of telephone apparatus.

MR. G. H. MORGANSTERN has resigned his position as manager of the sales department of the Chicago Pay Station Company, and has accepted a position with the VOUGHT-BERGER COMPANY of La Crosse, Wis., makers of telephones and switchboards. Mr. Morganstern is one of the best known men connected with the Independent telephone manufacturing industry. He is now head of the sales department of the Vought-Berger Company, and will endeavor to increase the sales of the company in various parts of the country.

THE CHICAGO WRITING MACHINE COMPANY has a unique desk set holder that will interest all users of the telephone. It is designed so that it can be screwed to the front or side of a desk, on top of a desk or table or to the wall or other fixture. When not in use, it is adapted to be folded out of the way. Here are a few of the advantageous points of the new holder: It is adjustable to any position, and stays where you put it. It is so strong it will hold many times the weight intended for it. Your telephone is always where you want it, *when* you want it. When you don't want it, it is out of the way. You don't have to set the telephone on your desk-slide every time you want to use it. You don't have to move the telephone every time you open or close your desk. Your telephone cannot fall and break. It is securely clamped in place.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, of Rochester, N. Y., and Chicago, has recently supplied the following equipment to Independent telephone companies: The Okaw Telephone Company, of Sadorus, Ill., purchased entire equipment. The South Prairie Telephone company of Sadorus, Ill., purchased entire equipment. The Northwest Prairie Telephone Company, of Sadorus, Ill., purchased its equipment from the Stromberg-Carlson Company. The White County Union Telephone Company, of Carmi, Ill., purchased additional equipment. The Citizens' Telephone Company, Grand Rapids, Michigan, recently purchased a 160 capacity, 100 equipped generator call switchboard for Traverse City, Michigan.

PLANTS FOR SALE

Advertisements under this head $1.00 *for* 25 *words or less for each insertion. Prepaid.*

TWO TELEPHONE EXCHANGES of 325 telephones in Missouri towns only 8 miles apart, 21 miles metallic and 30 miles grounded toll lines. Both exchanges and nearly all toll lines rebuilt this year and in first-class condition. Present owners desire to sell on account of too much other business to look after. Address LOCK BOX 4, Malden, Mo.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

WANTED

Advertisements under this head, 25 *cents for* 25 *words or less for each insertion. Prepaid.*

WANTED—A telephone man, who can be bookkeeper and collector as well as inspector or manager, for live Western town in the mountains. Only good men with references need apply. Address DEADWOOD, care of AMERICAN TELEPHONE JOURNAL, New York.

WANTED, position as manager or assistant of an exchange of 200 to 500 subscribers. Several years' experience; can give good references. Address J. E. THURSTON, North Vernon, Indiana.

POSITION by an all-round telephone man, as manager of small exchange or as inspector or troubleman. At present with Bell company. Address W. M. G., care AMERICAN TELEPHONE JOURNAL.

POSITION WANTED by young man of experience and thorough reliability, with ability to give an exchange the care and attention it should have. It may be to your interest to write me, stating salary. Address RELIABILITY, care AMERICAN TELEPHONE JOURNAL.

A COMPETENT MAN to take charge as Manager of a 200-subscriber telephone exchange. Position permanent on merit. Address Box 212, Milford, Indiana.

TELEPHONE SUPPLY SALESMAN with 15 years' experience as superintendent construction, manager operating department, right of way buyer, and salesman and installer of pay stations in U. S. and Canada, will be open for position January 15th. Address G. N. J., care THE AMERICAN TELEPHONE JOURNAL, New York.

I WANT the exclusive handling of an account, for Chicago trade, beginning January 1st. Manufacturers' Agency basis. Address SALESMAN, care AMERICAN TELEPHONE JOURNAL, Monadnock Building, Chicago.

The American Telephone Journal

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TELEPHONE EXCHANGE ENGINEERING—ARTICLE IV

BY RAY H. MANSON, ALBION D. T. LIBBY AND CHARLES A. SIMPSON

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TWO specially equipped desks shall be provided—one for the chief operator, and one for the wire chief, the woodwork of which shall be of mahogany and match that of the switchboard.

The lower portion of the cabinet shall contain standard desk drawers and the upper part pigeon-holes and jack-panels; unused portions of these panels shall be filled with ebonized wood. The shelf containing the keys shall be mounted on hinges capable of opening for inspection. This hinged portion shall be built similarly to the switchboard key-shelves. That portion of the shelf where the plugs rest shall be covered with seasoned sole leather, one-eighth of an inch thick, securely cemented, the skin side exposed.

Removable panelled doors concealing the apparatus in rear of cabinet shall be provided and constructed to make the enclosed portion dust-proof. Mounting racks of metal shall be provided for holding spring-jacks, lamp-jacks and relays.

The apparatus and circuits to be installed in the desks shall be in accordance with the specifications covering that of the switchboard.

CHIEF OPERATOR'S DESK.—A two-position combined chief operator's and monitor's desk shall be provided and equipped with all the necessary apparatus and circuits to supervise the exchange now installed, and with space sufficient for apparatus up to that required for the ultimate capacity.

The equipment shall consist of eighteen monitors' lamps with white caps, so arranged that when the calling pilot lamp at any position of the switchboard lights, the corresponding one of these lamps shall also light; eighteen monitors' lamps with red caps, so arranged that when the supervisory pilot lamp at any position lights, the corresponding one of these lamps shall light; thirty-six lines, two of which shall be so connected to each operator's telephone circuit that the chief operator, by going in on either one of these jacks, can talk with the operator at that position, and by going in on the other one, be bridged across the operator's circuits without allowing the operator to know that such is the case; these two jacks to be mounted immediately below the two pilot lamps for the same position; four regular lines terminating in lamps and jacks. Two of these shall end in cords and plugs in the plug shelf of the second position of the eighth section of the switchboard; one in the toll board; one in the wire chief's desk.

Each desk position shall contain five complete cord equipments and a complete operator's outfit.

WIRE CHIEF'S DESK.—The equipment of this desk shall consist of five testing trunks to the switchboard, terminating in plugs in the plug shelf of the second position of the eighth section; two desk lines to the intermediate distributing frame; one line with lamp and jacks to the chief operator's desk; one line, with lamp and jack, to the toll board; one testing trunk to the main distributing frame provided with a two-way, four contact plug for inserting between the terminals of a line; two connecting cord circuits; and one testing cord circuit. The testing cord circuit shall contain a standard "Weston" portable voltmeter, with two scales, one reading from naught (0) to fifteen (15) volts, and the other from naught (0) to one hundred and fifty (150) volts. This circuit shall contain necessary keys for changing the circuit connections when making tests. A "howler" circuit shall be provided and wired so that it may be connected to any subscribers' line. Also a complete operator's equipment shall be provided.

TOLL BOARD.

The toll board shall be of the magneto type, having all toll lines terminated in drops and jacks, and the interconnecting cords provided with high-wound bridging clearing-out drops. The trunk lines to the main switchboard to be of such design to extend the local subscribers' lines to the toll board, where the connecting to the toll lines shall be through special cord circuits arranged to give lamp supervision on the local half and clearing-out drop supervision on the toll half. The line shall be strictly metallic and perfectly balanced under all operating conditions; also all talking circuits shall be so designed as to be entirely free from cross talk or other inductive disturbances.

CAPACITY: 40 Toll lines.
6 Toll to toll cord equipments.
14 Toll to local cord equipments.
2 Operator equipments.
30 Two-way toll trunks to the main switchboard.
40 Extension toll lines to the main switchboard for night toll service.

EQUIPMENT: 20 Toll lines.
4 Toll to toll cord equipments.
10 Toll to local cord equipments.
2 Operator equipments.
18 Two-way toll trunks to the main switchboard.
20 Extension toll lines to the main switchboard for night toll service.

The toll board shall be designed for two operators' positions, each of which shall contain the following circuits: Ten toll line circuits; five toll to local cord circuits; two toll to toll cord circuits; one complete operator's circuit; one pilot call circuit; ten order wire keys with nine circuits to the main switchboard, one of which shall be wired to each alternate subscriber operators' positions.

The toll board shall be provided with eighteen two-way toll trunk circuits to the main switchboard, two at each alternate subscriber operators' positions; twenty circuits with switching keys to throw the toll lines over to the main switchboard for night service. A night alarm circuit shall be provided.

CABINET: The toll board cabinet shall be of the upright type, designed for two operator's positions, the general arrangement being similar to the main switchboard. The key and plug shelf shall be so designed that a calculagraph, ten and one-half inches in diameter, may be placed between the two toll positions. The key shelf shall be arranged to have a space of at least eight inches between the keys and front edge for filling out toll tickets. The height of the cabinet above the key shelf shall not exceed fifteen inches.

The woodwork shall be of the same kind and finish as that of the main switchboard, neatly joined and designed to make the cabinet dust-proof.

APPARATUS: The toll board apparatus shall be of the same design as that of the main switchboard and of the same grade and finish.

TOLL LINE EQUIPMENT: Each toll line shall be equipped with an answering jack and line drop. The jacks shall be wired in strips of ten and located under and in line with their associated drops. The spring jacks shall be constructed with platinum-pointed contact springs, arranged to cut off both sides of the line from the drop winding when a plug is inserted. The line drops shall be of the tubular type, mounted in strips of ten and wound

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EDITOR'S NOTE. The first article of this series appeared in the issue of Nov. 22. They will continue for many months.

to a resistance of one thousand ohms, the drop shells being entirely insulated from each other and from the mounting strip. The drops shall be provided with a reliable night alarm contact.

Toll Cord Equipment: Two kinds of cord equipment shall be provided for each toll position—one for interconnecting the toll lines, and the other for connecting the toll to local lines.

The toll to toll cord circuits shall consist of a pair of plugs and cords, with a combination ringing, listening and ring-back key, and with a tubular clearing-out drop.

The toll to local cord circuits shall contain, besides the above apparatus, a supervising lamp signal for the common battery or local half of the circuit, and a repeating coil for separating this half from the toll half.

The combination ringing, listening and ring-back keys shall be located in the hinged portion of the shelf, and so connected that the operator rings on the front cord by pulling the first key handle towards her, the key returning to normal when pressure is released. Throwing this key in the opposite direction shall connect her talking set with the cord circuit, the key remaining in this position until restored manually. Mounted directly behind this lever shall be a ring-back key to ring on the back cord of the pair when its lever is pulled towards the operator, returning to normal when the pressure is released.

The tubular clearing-out drop shall be of the same design and resistance as the toll line drops, and shall be mounted in the upper part of the toll board panels to correspond to their respective cord circuits.

Operator's Equipment: Each toll operator's equipment shall consist of similar apparatus and arrangement of circuit as is used on the main switchboard, with the addition of a primary cut-out key for short-circuiting the transmitter.

Toll Trunk Equipment: The toll trunks to the main switchboard shall terminate in plugs and cords with associated supervisory disconnect lamp signals at the local end and jacks and lamps at the toll board end. These trunks shall be of the two-way type, designed to give service in either direction. Order wire circuits, multipled in each toll position and extended to the main switchboard, shall be provided for the two-way trunks for making toll to local connections. The local to toll connections shall be automatic by lamp signal. The method of operating shall be as follows:

When the local operator receives a call for toll, she will connect the calling subscriber with the toll board by inserting the plug belonging to the toll trunk into the multiple jack of the calling subscriber's line. The toll operator receives the call automatically by lamp signal and completes the connection. The supervision is in the hands of the toll operator, who receives the disconnect signal directly from the local subscriber. On pulling down at the toll board, the disconnect signal to the main switchboard is given automatically by a disconnect lamp on the toll trunk cord. For incoming toll calls, the toll operator orders up the desired local subscriber over the same toll trunk circuit by means of an order wire circuit, thus having complete supervision and control of the toll connection in the same manner as described for outgoing toll calls.

Auxiliary Signal Circuits: A "calling pilot" signal of the same design as that specified under switchboard "Auxiliary Signals" shall be provided and connected to the line drops or toll trunk calling lamps. This pilot shall also ring a night bell, when the lamp lights, depending on the position of a night alarm switch.

Extension Lines for Night Service: Extension circuits, arranged with switching keys, shall be provided for throwing the toll lines over to the night toll apparatus located in the first position of the main switchboard, thus allowing the toll business to be handled at the main switchboard during such times as there are not enough long distance calls to keep the regular toll operators busy.

DISTRIBUTING FRAMES.

The distributing frames, relay racks and cable runs shall be made from structural iron of open construction, heavily coated with a good quality of metallic paint after assembling, and so designed and braced as to be perfectly rigid and substantial.

Jumper rings, with rubber insulation vulcanized over the same, shall be provided for the main and intermediate distributing frames, and shall be arranged in a manner suitable for readily making or removing connections from one set of distributing frame clips to any other set on the same frame.

All terminal clips shall be of suitable design to meet the requirements, and shall be well tinned for soldering and mounted in hard rubber insulation.

Iron work runways shall be provided between the frames and switchboard for cables and other conductors, the same being of sufficient capacity for the ultimate requirements of the exchange.

All apparatus mounted on the frames shall have designation marks or numbers showing with what circuit it is associated.

Main Distributing Frame: A main distributing frame shall be provided, with capacity for four thousand lines on the line side and lightning arresters and sneak current protectors for the present equipment, including toll lines, trunk lines, order wire circuits, etc., on the switchboard side.

The lightning arrester and sneak current protector shall be of a reliable and efficient design, the protector circuit being so arranged that in operating it will close a local circuit and ring a buzzer.

Intermediate Distributing Frame: An intermediate distributing frame, with a framework of a size to correspond to that of the main frame, shall be furnished and provided with connectors for the present equipment. This frame shall be so arranged that any line may be connected to any one operator's position without changing the number of the outside line or that of the multiple jacks.

Relay Rack: A relay rack shall be furnished for mounting the line relays, and this rack shall be preferably located between the main and intermediate distributing frames.

POWER PLANT.

A power plant, complete in all respects, shall be furnished, having sufficient capacity to meet all the requirements of the exchange when the ultimate number of lines shall have been connected. It shall consist of a power and fuse board, two charging machines, two ringing machines with don't answer and busy back attachments, a complete storage battery plant and all other necessary apparatus. Iron armored conduits shall be supplied and installed for the wiring between machines, power board, storage battery, etc.

Power and Fuse Board: The power switchboard and fuse board shall be of the combination type, made from the best grade of slate or marble, mounted in a structural steel framework. The power board shall be provided with all-copper switches of sufficient capacity and of such arrangement as to enable all desirable changes in the power circuits to be made conveniently and quickly. It shall be designed with three panels—one for mounting the motor controlling apparatus, one for the generator apparatus, and the other for the fuse board terminals, which are to take all the discharge circuits to the operating switchboard.

Flush type voltmeters and an ammeter of the Weston Electrical Instrument Company's make, capable of measuring all voltages and currents, shall be mounted in the face of the board; one being a 0-3 scale voltmeter for measuring the voltage of each cell of battery. Rotary double-pole switches, making a good reliable contact with their several terminals, shall be provided for controlling the circuits of the voltmeters and ammeter. Underload and overload circuit breakers of the I. T. E. type, with suitable capacity for the ultimate requirements of the power plant, shall be provided for the charging circuits and mounted on the face of the board. The circuit breakers, switches and all other apparatus shall be rear connected. Suitable starting boxes and rheostats for the charging and ringing machines shall be located in convenient positions on the board, the controlling handles, with indicating dials, being the only parts of the same to project from the front of the slabs.

The fuse panel shall contain copper bus-bars and fuse studs, with suitable capacity fuses for protecting all individual discharge circuits. The power and fuse board shall be lighted with 16 c. p. incandescent lamps, mounted in brackets, with shades, and located at the top and middle of each panel. The board shall be provided with a sheet iron apron entirely enclosing the space between the floor and slabs, which latter shall not come nearer the floor than twelve inches. This apron is to conceal the iron conduits coming up in the rear. All wiring shall be done and bus-bars mounted on the rear of the board in a neat and workmanlike manner and in accordance with the National Board of Fire Underwriters' rules.

Charging Machines: A duplicate set of Holtzer-Cabot charging machines shall be supplied for charging the storage batteries. The two machines of each set shall be mounted on the same iron sub-base and are to be connected by a flexible coupling. The motor of one set shall be adapted to run from a 220-volt D. C. circuit, and the motor of the other set to operate from a 500-volt D. C. power circuit. The generators of both sets are to be of the multi-polar type, shunt-wound, and so designed and connected that the batteries may be charged while furnishing current for the exchange without creating noise in any of the talking circuits.

FOREIGN CURRENTS

By The Arrester.

ANOTHER Richmond is in the field recommending telephone schemes to British municipalities. Mr. F. F. Bennett, of Manchester (not to be confounded with the real thing Mr. A. R. Bennett, of Glasgow and the States of Guernsey), has recently laid before the Town Council of Newport, Monmouthshire, an estimate which provides for a system of one thousand subscribers to cost $60,000, or an average of $60 per station. Mr. Bennett pins his faith to the party line system, with any number of stations on a line up to six, as the best way of keeping capital costs low and rendering cheap rates feasible. He has a scale of rates embodying flat rates for unlimited direct line service, the familiar divided message rates of $17.50 a year and one cent a call and of $12.50 a year and two cents a call, and party line rates for two, three, four, five or six station lines, ranging down to about ten dollars a station. Mr. Bennett has so much faith in his scheme that he is willing, if the Council preferred not to adopt it as a municipal undertaking, to introduce a company prepared to take up the venture. The Newport Committee takes Mr. Bennett at his word, having decided not to recommend a municipal scheme or Mr. Bennett's plan, but stating its willingness to consider any proposition that may be made on behalf of a company willing to come in and establish a competing system. The Newport Committee shows a most commendable amount of caution.

* * *

The *Electrical Times* thinks that "it is certain that a telephone system to cater largely for party line subscribers must be extremely complicated to work, and it can hardly give the party line subscriber satisfaction, especially if he be one of six on a line. Anyhow, the service would not be good enough to provide effective competition with the National Telephone Company, nor would $60,000 go far in a large town like Newport." This is, of course, not very expert criticism as the party line system is the most logical and correct method of providing cheap service in a small system. The adoption of selective ringing of subscribers' bells removes one of the greatest objections to party line service, and a well managed concern can give a very good and cheap service to small subscribers by means of party lines equipped with selective bells. The quality of the service will depend almost entirely on the management. One has to say "almost" because a reasonable amount of co-operation on the part of the subscribers is necessary to make any telephone service work thoroughly well, and this element is of greater importance in the case of party lines. But it is a part of good management to secure this co-operation from the subscribers.

* * *

A correspondent, who signs himself "Magneto," writes the following highly interesting letter to the London *Electrical Review*, under the heading of "Direct Working Telephones": "Direct working telephones are largely used on the Continent and the demand for them in this country is increasing. The number sold is at least equal to the number of medium distance induction coil telephones. There is every indication of the number being increased largely in the near future, as the advantages peculiar to them become better known. Judging from American technical literature they are practically unknown in the United States of America, or at least the demand for them is extremely small. Generally speaking, the other types of telephones are used to much the same extent in all countries. The writer would be pleased if someone conversant with American telephone practice would state the views of the Americans on the merits and usage of direct working telephones." As a model of clearness this letter is hard to beat. In the first place, what in the name of Bell *is* a "direct working telephone?" Does "Magneto" mean a battery telephone without induction coil or does he mean a plain magneto telephone? And what is a "medium distance induction coil telephone," and what are "the other types of telephones" that "are used to much the same extent in all countries?" THE AMERICAN TELEPHONE JOURNAL might use this letter as a prize puzzle. If it has any meaning at all, we may expect soon that Americans will be asked for their views on the "merits and usage" of pushcarts as compared with trolley-cars or dumb-waiters as compared with electric elevators.

The use of the telephone in connection with railway working is extending to Europe. The Bavarian State Railways have adopted a system of telephone communication on similar lines to those which have found favor with progressive railway men in this country. The telephone is used both for "regulating" the train service, *i. e.*, train-despatching, and for communication between trainmen and signalmen and despatchers. All local trains carry portable telephone sets, and what is called an "extendible" telephone set is used for communicating from along the line with a signal box or headquarters. A special telephone wire is run on green-striped porcelain insulators on the regular telegraph poles, the colored insulators rendering it easy to pick out the telephone wires when connection is to be made by means of an "extendible" telephone set. By this means those in charge of sections of the road are able to telephone immediately to headquarters anything that occurs along the part of the line entrusted to their care. The distinctive insulators for the telephone line strikes one as rather a good idea. It is intended to equip all the railways in Bavaria with telephone systems on this plan.

* * *

In the discussion of the Glasgow Town Council on the proposal to increase the telephone capital account by $400,000 to a total of $1,500,000 some opposition was made. It was pointed out that the original estimate stated that the cost per line would be $95, whereas $1,120,000 had been expended on some 7,400 subscribers, making the average cost per line $150. The advocates of the additional loan stated that the expenditure of the extra $400,000 would bring the plant up to a capacity of about 11,000 lines, which, it was pointed out by the opposition, would make the capital cost per subscriber average about $136 as against the $95 originally estimated. The opponents of the loan thought that as the license expired in 1913, and as the corporation had to meet the competition of the National company, which, besides its depreciation fund had a reserve fund to help it out against the time when the business would be taken over by the government, extensions to the corporation system ought to cease.

* * *

Naturally that suggestion was not adopted, as the Glasgow Corporation having committed itself to the telephone business is bound to carry it through even though the plant cost fifty per cent. more than was originally estimated. One councillor contended that the service had been an undoubted success. Who would have believed that they would have secured 7,800 subscribers? Already they knew of practically 9,000, and within a year or two there would be probably 15,000 subscribers. The opposition said that there must always be an increasing percentage of unemployed plant, and as they increased their installation so would their unproductive plant increase. The chairman of the committee said that they would continue to take orders until the time came for the government to take over the telephones. The lines had been put down under the direct supervision of the government, and if the post-office took over the telephones in 1913 they would give the Corporation full value for them. He remarked that if the Corporation had not entered upon the telephone enterprise they would have been paying $75 for each instrument to the National Telephone Company. With a shudder the committee voted for the increase of capital by 48 votes to 9.

OHIO COUNTRY SYSTEM

A GOOD illustration of enterprise and of the utility of a telephone system in country districts is to be met with at Tontogany, Wood county, Ohio. The agitation for the installation of an Independent telephone system was commenced in that neighborhood about a year ago. The metallic system was adopted and has proven a great success. There are to-day about 100 telephones in operation on the system and orders for 30 more are already in, and not over half the territory is yet covered. It is expected that inside of a year at least 300 subscribers will be served. The Tontogany system is connected with the United States long-distance line, covering all the principal towns of Wood, Henry and Lucas counties—3,000 telephones in all.

TELEPHONE TO PREVENT RAILWAY COLLISIONS

CONSUL-GENERAL FRANK H. MASON at Berlin, Germany, in a report to the State Department recently tells of some interesting experiments for the prevention of railway collisions by using a telephone. The report in part says:

"Midway between the rails is laid a light third rail of the ordinary T pattern, the joints of which are so connected as to form a continuous conductor.

"Midway under the forward part of the engine is hung the working instrument, an electrical apparatus inclosed in a square case or jacket occupying a cubic foot of space. The instrument is connected with a contact shoe, which slides along the third rail and by wires with a telephone and electric alarm bell in the cab of the engine driver, and a red incandescent lamp which is lighted by the same impulse that rouses the alarm bell into action. A further improvement of the device sets the electric brakes on the engine or entire train simultaneously with the alarm signal which sounds the bell and lights the lamp. The apparatus is so adjusted and arranged that the engineer can at any moment, by touching a lever, satisfy himself that it is in full working condition.

"The tests on November 12 were conducted on the main line from Frankfort to Hanau, between the stations Sachsenhausen and Goldstein, and a translation of the official report will illustrate concisely the working of the apparatus.

"Two locomotives, numbered respectively 290 and 1420, had been equipped with the new device and the experiments proceeded as follows: Engine 20 drawing a special train and approaching Sachsenhausen at full speed, received the danger signal and came to a full stop; the driver of 290 then asked by telephone the cause of the signal and received from the keeper of a grade crossing, half a mile in front, word that a wagon had broken down in crossing the track and obstructed the line. After 10 minutes' wait, the engineer of 290 received word by telephone that the obstruction had been cleared, and thereupon resumed his trip.

"A mile farther on, the signal on 290 again sounded, and the driver was informed by the telephone as before, that the semaphore round a curve and more than half a mile distant, was set at 'halt.' Thereupon engine 290 slowed down, and proceeded cautiously, sounding its whistle at short intervals, the telephone bell in the driver's cab ringing continuously until the curve was rounded, when the ringing ceased, notifying the engineer that the semaphore had changed to 'track clear.' Thereupon 290 resumed full speed.

"In the tests to prevent collision, engine 1420 came up rapidly from behind and on the same track as 290 which had slowed down and was proceeding cautiously in consequence of reported danger in front. The moment that 1420 came within 1,000 meters (1093 yards) of 290, the signal on both engines began to ring and their red lights to glow. Thereupon 1420 halted, the driver inquired of 290 in front the cause of the alarm, and a complete understanding between the two trains was immediately established.

"An important point in this connection is that in practice the same warning signal is sounded upon every engine equipped with the apparatus which is on the same track and within the prescribed radius—a kilometer or a mile, as the case may be—from the engine and train which cause the obstruction.

"The German government has directed that a section of track be equipped with the apparatus for careful, practical experiments, and it is reported that the government of Russia has obtained license to test it in actual service on its new military lines now under construction in Siberia."

A STIMULANT TO OPERATORS

ONE of the chief contributing causes to the popularity of the Louisville Home Telephone Company in Louisville, Ky., is the courtesy shown subscribers by the operators. This is something the people of Louisville were not accustomed to. They had come to believe that discourtesy and impertinence were one of the necessary evils of a telephone service. With the coming of the Louisville Home Company, however, all this was changed.

For this new state of affairs much credit is due to the general manager of the company, Mr. A. L. Têtu. He realized that the best hope for successful competition with the Cumberland Company lay in having polite, courteous operators, and giving a prompt efficient service. To secure these results it was essential to have perfect discipline in the operating room. The operators must be made to feel that their relations with the company would be on the same friendly basis as would be the relations between them and the public. Too much in his opinion could not be done to make the operators comfortable and contented.

In a recent communication to the AMERICAN TELEPHONE JOURNAL, Mr. Têtu clearly sets forth his ideas on this important subject, in the following language:

"We first set out with the idea, which we still maintain, that perhaps we ought to impress upon our girls, by visible evidence, the fact that we expected to treat them not altogether from the standpoint of what they did for their salaries or what we paid them to do; but that it would be our purpose to introduce into our business methods a course of treatment of all of our employees, which would radically differ from that to which they had been accustomed.

"We, therefore, commenced by not only affording them relief during the morning and afternoon and giving them one hour for their luncheon, but provided a suitable place for their recreation and luncheon, and endeavored to assure them that our interest would be spread further than the ordinary relation of employer and employee. The young women took kindly to the innovation, and on all sides we heard that a comparison between existing and past conditions was much in our favor."

The Louisville Home Company, through Mr. Têtu, has inaugurated a system of prizes to be awarded the most efficient operators. Here is what he says of this plan:

"My idea of the merits of a prize system was obtained while with the National Cash Register Company, of Dayton, Ohio, throughout whose entire organization a system of prizes has been in vogue for some years past, with the most beneficial results.

"Our girls always did, as a rule, give good service; but with a view to even bettering it, we introduced recently the money prize system, giving $25, distributed in five different prizes, to the five girls whose work most entitled them to recognition. Speed and accuracy were the essential elements of their switchboard service, so far as the public was concerned; but there also figured in the final decision, the question of deportment and attendance.

"To secure such information as would enable us to intelligently decide the matter, our solicitors and collectors were each furnished with a ticket, and were to make daily tests from subscribers' stations, recording the result of these tests upon the tickets. Then we arranged a sheet ruled off to accommodate the working days of the month and the numbers of the operators from 1 to 125, and in each of the spaces opposite the operator's number, recorded the results of the daily tests, making a record in red ink of the number of calls, and in black ink, of the total number of seconds employed in answering these calls. We maintained this first record from the 15th of November until the 15th of December, between which dates 2,132 calls were made, occupying 7,675 1-5 seconds. All the girls who won prizes had 100 per cent. each in attendance and deportment. The girl who won the first prize answered 35 calls in an average of 1 3-5 seconds, while the fifth prize was given the girl who answered 19 calls in an average of 3¼ seconds.

"So successful was the experiment, and we can only measure it by the many compliments we have received about our service, that we decided to make it a monthly test, substituting for money prizes, three prizes as follows:

"First prize, one week's vacation; second prize, three days' vacation, and third prize, two days' vacation, all with pay.

"If our belief is borne out with developments, we will, from time to time, introduce money prizes as well as these vacation prizes, giving the winners their choice as between the money and their vacation."

ELECTRICAL MEASUREMENTS—ARTICLE IV—THE D'ARSONVAL GALVANOMETER

By Arthur Vaughan Abbott.

THE reflecting galvanometer described in the previous paper is open to one very serious objection. Its extreme sensitiveness causes it to be affected by the slightest change in any neighboring magnetic conditions, so that the use of such an instrument in a modern power station, surrounded by the field magnets of powerful dynamos, is extremely difficult or impossible. Even an electric car passing in a neighboring street will cause the spot of light to waver on the scale.

It has been shown that there is a mutual reaction between the wire which carries the current and the magnetic needle that, in the form of galvanometer described, is allowed to move and whose motion measures the current. Suppose now the needle to be made fast and the wire coil to be delicately suspended so as to be easily deflectable. Evidently, though the structural relation of the magnet and the coil is reversed, the same essential conditions prevail, and there will be a corresponding repulsion between the magnet and the coil. But, while the needle is fast and cannot move, the coil can respond to the reaction between the current it carries and the magnet, and as it swings its motion may be employed to estimate the current exactly in the same manner as the motion of the needle was used in the other type of galvanometer. If the needle be made rigid there is no necessity for lightness, and it can be constructed of any size and weight that may be desirable. It may, therefore, take the form of a very large and powerful magnet, capable of producing so strong a magnetic field that no neighboring magnetic conditions will be able to overpower it, and it is hardly exaggeration to say that a galvanometer made in this way can be placed upon the top of the largest dynamo and yet yield results of reasonable accuracy.

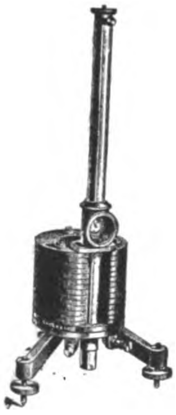


FIG. 1.

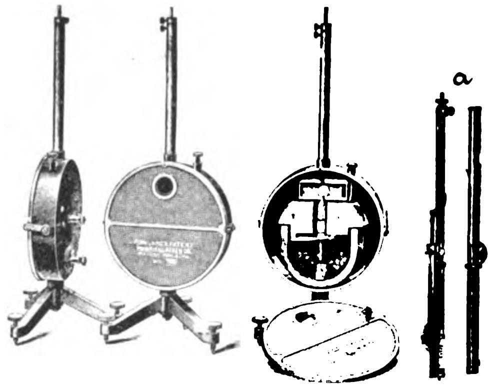


FIG. 2.

From the name of its inventor, this form of galvanometer is called the D'Arsonval. As in the Thompson instrument, there is a heavy insulating base plate, supported by three leveling screws, that carries a glass case to protect the instrument, but here the resemblance ceases. Instead of a series of fixed wire coils there is a very large, powerful and heavy magnet secured to the base plate. The poles of this magnet are turned upward, and between them one may see a light wire coil suspended from an adjusting screw, supported by a brass standard, set inside of the case. Directly over the wire coil the reflecting mirror is attached. The lower end of the coil is carried to a very light and flexible spring attached to the base of the instrument. This spring serves the double purpose of steadying the swinging coil and of carrying the current to be measured, for the spring is in communication with one of the binding posts on the base plate. The other end of the coil is in electrical communication with the other binding post through the brass standard from which it hangs. It is easy to see that here the same elements exist as in the previously described form of instrument, namely, a magnet and a wire that carries the current, which are relatively movable to each other; but in this type the magnet is very large, heavy and fixed, while the coil is light and delicately suspended. In the Thompson the coils are large, heavy and fixed, while the needle is light and delicately suspended. By means of the large magnet the wire coil is constantly enclosed in a very powerful magnetic field—so powerful that no outside influence can have a perceptible effect thereon. So an instrument of this kind is completely unaffected by dynamos or electric cars, and may be used with impunity under conditions where the Thompson type would be utterly at fault.

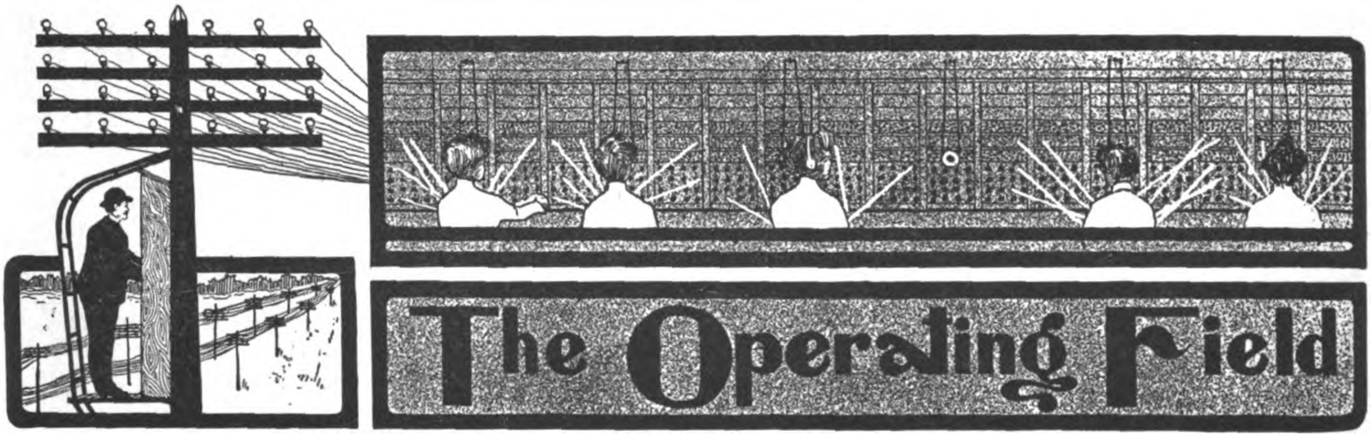
With all these advantages, the D'Arsonval does not possess the extreme delicacy, sensitiveness and accuracy of the Thompson, for it is evident that the minute needle system of the other can be made much lighter and more sensitive than the hanging coil of the former. To secure the requisite lightness the coil must be made as small as possible, and hence cannot have as many turns as in the Thompson. In the D'Arsonval the coil must be supported by a wire, capable of conducting the current to be measured from the binding posts to the coil, and even the finest wire is far more rigid and inflexible than the quartz filament or the bit of cocoon silk. For this reason it is impossible for the D'Arsonval to attain the refinement of the Thompson, and for the most sensitive, accurate and delicate measurements the latter is always used, but of late years the D'Arsonval, owing to its insensitiveness to neighboring disturbances, has come into very wide and extensive use, has been improved so greatly as to become the almost universal instrument in the hands of the modern electrical engineer, and the principles employed in this instrument form the base of the majority of electrical measuring instruments now in current use.

A favorite form of the D'Arsonval is shown in Fig. 1. There is a tripod of cast iron equipped with proper leveling screws in each leg. On this a very powerful magnet, made of crescent-shaped discs of hardened steel, about one-eighth of an inch thick, set horizontally, is placed. The horns of the steel plates nearly touch each other and are bored out to receive a brass tube a little less than an inch in diameter and from fifteen to eighteen inches long. This tube is a notable feature, for it contains the movable coil, suspension and mirror, and possesses the advantage that it can be instantly removed and exchanged for another tube carrying a coil of different sensibility, or in case of injury to the suspension a new tube may be substituted without delay. The mirror is placed in a chamber that is formed in the tube just above the top of the magnet and protected by a piece of plate glass. Thus the entire working mechanism is enclosed and guarded from injury, even under the most trying circumstances. Such a model possesses extreme portability, for the tube containing the suspension may be removed and carried in the hand, while the base, with its heavy magnet, can be carted about with the utmost carelessness.

The movements of the mirror may be observed with a telescope and scale, as explained in last week's paper, but preferably in the testing room by an incandescent lamp so hung as to shine upon the mirror, which will reflect an image of the glowing filament on the scale, where it will appear as a bright band of light, allowing divisions to be read with the greatest ease. Fig. 2 shows an excellent pattern of the D'Arsonval galvanometer. It is a tripod type that employs a horseshoe magnet, by some considered superior to the horizontal form. This model is not quite so portable, as the whole instrument must be packed up without the removal of the suspension, and thus more care must be exercised in transportation.

D'Arsonval galvanometers are made in a host of different forms and designs, so there is the widest range as to sensitiveness, finish and price. A fair instrument can be obtained for from fifteen to twenty dollars, while the types here illustrated when constructed by the best makers cost from thirty-five to fifty-five dollars, and will be found to be amply sufficient for all the ordinary purposes of the practicing electrical engineer.

Editor's Note.—The first article of this series appeared in the issue of January 17. They will continue for many months.



CUMBERLAND WILL VACATE?

RECENT advices from Evansville, Ind., intimate that the Cumberland Telephone and Telegraph Company, to punish the audacity of that city in attempting to force it to withdraw from Evansville, will pack up its exchange, pull down its pole lines and leave the city without any telephone service. If it should do this, the city would, of course, suffer considerable inconvenience. Cities and towns in Southern Indiana would also be inconvenienced, for they would be cut off from communication with the Northern Indiana towns. This would be but a temporary calamity, though, and one that the telephone users of Evansville would in all probability willingly suffer.

In any event, Evansville will soon have a telephone service independent of the Cumberland, and the latter will probably be forced to discontinue giving service in the city. The manager of the Cumberland company emphatically denies that his company will leave Evansville under any circumstances. The Cumberland was ordered by the city authorities to withdraw from the field, but obtained a temporary injunction. This case will come up for trial early in April and the authorities confidently expect to obtain a verdict.

City Attorney Albert Funkhouser, in a recent letter to THE AMERICAN TELEPHONE JOURNAL, says the municipal scheme for a new telephone company is rapidly coming to a head.

The first franchise granted to the Cumberland Telephone and Telegraph Company in Evansville expired in 1887, and before it could have the franchise renewed an Independent company was organized and had obtained a perpetual franchise from the city. The Cumberland then bought out the Independent company and secured a new fifteen year franchise. This franchise expired in June, 1902. At its expiration the Cumberland sought to have it renewed, but was refused. The Cumberland service had always been poor and was steadily growing worse in every respect. The telephone users of Evansville viewed with envy the popular service given by the Independent companies in nearby cities. The result of it all was that the Cumberland's proposition was unanimously turned down and an agitation for an Independent company started.

The Cumberland company, not being able to have its franchise renewed, then claimed the right to operate under the franchise of the Independent company, which it had purchased.

CUYAHOGA TELEPHONE COMPANY MEETING.

AT THE annual meeting of the Cuyahoga Telephone Company, at Cleveland, Ohio, the directors were re-elected with the exception of N. A. Gilbert, who retired, J. R. Sprankle being elected in his stead. The board is now made up as follows: F. S. Dickson, H. A. Everett, R. A. Harman, W. H. Lamprecht, E. W. Moore, H. R. Newcomb, F. T. Pomeroy, F. M. Stearns, B. Mahler, J. W. Marsh and J. R. Sprankle. The directors elected the following officers: President, F. S. Dickson; vice-president, E. W. Moore; secretary, James B. Hoge; treasurer, R. W. Judd. The following is the financial statement of the company for the year ended December 31, 1902:

ASSETS.

Property and plant	$5,714,242.85
Material and supplies	60,615.68
Current assets	101,724.69
Deferred assets	1,756.40
Total assets	$5,878,339.62
Deficit	29,142.72
Total	$5,907,482.34

LIABILITIES.

Capital stock	$3,000,000.00
Bonded debt	2,233,000.00
Current liabilities	196,046.51
Federal Telephone Company	475,392.92
Deferred liabilities	3,042.91
Total liabilities	$5,907,482.34

EARNINGS AND EXPENSES FOR THE YEAR 1902.

EARNINGS.

Rentals, telephone	$313,857.21
Rentals, building	45,141.19
Tolls	11,402.50
Miscellaneous	15,451.24
Total earnings	$385,852.14

EXPENSES.

Operating	$59,052.47
Maintenance	114,689.45
General	36,546.83
Total expenses	$210,288.75
Taxes	19,420.84
Total expenses and taxes	$229,709.59
Net income	$156,142.55

DEDUCTIONS FROM INCOME.

Bond interest	$111,650.00
Reserve for bad debts and depreciation	40,858.11
Miscellaneous interest	3,092.37
Total deductions from income	$155,600.48
Surplus for period	$542.07
Deficit, December 31, 1901	29,684.79
Deficit, December 31, 1902	$29,142.72

The report of President Dickson was as follows:

"The report of the treasurer for the year 1902 shows a surplus of $542.07 and the operations since organization a loss of $29,142.72. This result is due to two causes; first, extravagance in management, and second, low rates for telephones.

"The extravagant expense for operating and maintenance is due to the fact that we have more employes than we can find work for. This will be corrected forthwith. Since the first of January the salary account has been cut down to the extent of fully $7,000 per year, and I am of the opinion that a further saving of expense in this line of fully $20,000 may be effected, and yet the efficiency of the service vastly improved.

"In the operating room I believe it is quite possible to reduce the number of employes fully 20 per cent. The wages heretofore paid for this class of work have been lower than in other exchanges, and lower than we should pay to secure efficient service. I propose that the number of employes be reduced so that each shall have a full day's work and for it each shall receive an honest day's wages.

"The cost of collecting rentals for telephones exceeds $10,000 a year, and I am informed that this work has been done by other companies of the same size for about $6,000. We propose to reduce this item to a proper figure during the coming year.

"The expenses of general management have also in the past been far too high. We propose to decrease it by discontinuing altogether useless departments and consolidating others. I believe we will thereby secure at once a saving in expense, simplicity in management and a greater certainty in placing responsibility.

"The net income for this building was for the past year $11,397.66, about 3 per cent of its cost. This is far too low, but as the item of expense alone amounted to $21,502.27, I feel sure that with careful supervision a proper income can be earned during the coming year. Extravagant waste has characterized the management of the building in the past in every department, and such waste must be stopped.

"The collection of rentals of telephones made by this company in the past have been most unsatisfactory. During the first quarter of 1902 a total of $73,197.57 was collected, this being 93.1 per cent of the rentals actually due. The second quarter showed $72,832.24, or 92 4-5 per cent; the third quarter showed $70,937.16, or 90 2-5 per cent; the fourth quarter showed $78,197.62, or 98½ per cent. The total collections for the year were $295,134.59; the amount due was $313,857.21, showing a total average for the year of only 94 per cent.

"For such a state of affairs there can be absolutely no excuse.

"You will notice in the treasurer's report that $40,448.29 is set down as held in reserve for bad debts. This is about 13 per cent of the total earnings. I know of no business in which so large a percentage of loss is considered justifiable.

"As to a possible increase in rates, I have to report that the Circuit Court at Findlay, Ohio, filed an opinion denying that the municipal legislature has any authority to regulate the rates charged by telephone companies. Three of the leading law firms of this city have been asked to examine into this question and advise us as to our rights to regulate rates, notwithstanding the restriction in the ordinance under which we are acting. As far as yet heard from, the opinion has been expressed that we have the right to regulate our rates without reference to the ordinance. When we will be in a position to take advantage of this and readjust our rates in conformity with the extent of the service rendered by us I cannot now say. Certainly I will not advise an increase in rates until the efficiency of our service will justify us in asking it. To-day I regret to state that this is not the case. We must first put our house in order.

"You will notice by the treasurer's report that the Cuyahoga Telephone Company is indebted to the Federal Telephone Company in the sum of $475,392.92. This amount was for expenditures made by the Reserve Construction Company in increases to the plant. It was expected that the company would be able to continue this work and increase the number of telephones in service sufficient to warrant the issue of enough bonds to pay for the extensions. The financial difficulties in which we were involved more than a year ago prevented the completion of this work, and the debt now stands, with no immediate possibility of being able to meet it in the way intended."

Mr. Dickson here tells of his efforts to induce the bondholders to help finance the company by taking preferred stock at 60, and continues:

"On the 28th of January I received a formal reply from the bondholders' committee, giving me to understand that we could look for no support from that source, and that if this company was to be financed it would have to be done by the stockholders and not by the bondholders.

"During the coming week a communication will be sent to each of you inviting subscriptions to this issue of preferred stock, and we beg that you will give the matter your careful consideration. You must reflect that this plant, as laid out originally, contemplated a much larger extension than we have been able thus far to make, and, in consequence, a large percentage of our cost is now unproductive owing to the fact that we have not the funds to pay for the extensions and telephones, and that only when these improvements are made will it be possible for us to earn an income on our full investment. Everything depends upon it being made possible for us to put this plant in condition to earn an income on its entire cost. To do this we must spend more money. We can operate this company as it now is, with economy and care, and pay our running expenses and bonded interest, but we can do no more unless we can extend and improve the service so as to justify an increase in rates. Your directors and officers will be powerless unless they are supported loyally by the stockholders."

OHIO TRAFFIC ORGANIZATION.

OHIO Independent telephone managers organized the Ohio Independent Telephone Traffic Company, after a two days' meeting, at Cleveland, Ohio, February 5 and 6, 1903. It has a capital stock of $10,000, divided into 1,000 shares of $10 a share. The object of the company is to maintain a permanent headquarters for the auditing and clearing of interchange toll business, preparation and publication of telephone books, sale of telephone supplies and sundries, the employing and maintaining a corps of technical and professional men, and the operation of a bad debts exchange.

Thirty-two companies subscribed for stock. The stockholding was limited to 10 shares to each company and no holder will be allowed more than one vote. The United States shield was adopted as the emblem of the Ohio Independent companies. The main office will be temporarily at Cleveland, but will later be removed to Columbus. For the present the management of the business is in the hands of H. H. Robinson, assistant general manager of the United States Telephone Company. The following officers were elected: President, W. Gilbert Thompson, secretary of the Valley Telephone Company of Lebanon; first vice-president, Judge Grissinger, president Marion County Telephone Company; second vice-president, H. C. Devin, secretary Mt. Vernon Telephone Company; treasurer, A. V. Hageman, secretary Black River Telephone Company of Lorain. The secretary was not selected, as he will be a paid man and will devote his entire attention to the interests of the company. The directors were elected as follows: G. P. Thorpe, secretary Clinton Telephone Company of Wellington; F. L. Beam, general manager Citizens' Telephone Company of Columbus; Carl C. Curtis, general manager Sandusky Telephone Company; H. H. Robinson, assistant general manager United States Telephone Company, Cleveland; R. E. Hamlin, secretary Toledo Home Telephone Company.

The executive committee consists of the president, treasurer and H. H. Robinson, assistant general manager of the United States Telephone Company.

AN ENTERPRISING TELEPHONE TOWN.

CADIZ, Ind., a little hamlet of 200 people, claims to be the telephone centre of the country. It is now headquarters for twenty-two co-operative lines, having from twelve subscribers up. In addition there are five long-distance lines connecting with the co-operatives. Cadiz patrons have free connections with a thousand telephones in Eastern Indiana. The Cadiz folks give free connection to companies of other towns and get free connections themselves. They and the farmers that surround them claim the widest and cheapest service in Indiana.

LISBON, IA., TELEPHONE COMPANY.

THE Lisbon Telephone Company, of Lisbon, Ia., commenced operation in 1899 with 54 subscribers, which have since been increased to 131 town and 210 county subscribers. The company is a stock organization, shares being issued at $50 a share. It is in a very prosperous condition, owns its own plant, put in at an expense of $17,000, has 275 miles of W. & M., B. B. and extra B. B. galvanized iron wire, and has a toll line to Martelle. Several country lines also run into the Lisbon exchange, receiving excellent service. The plant is equipped with the Eureka switchboard and American and Eureka telephones.

Rates for business houses are fixed at $18 and residences at $12. The present officers are Dr. E. Burd, president; Sol. Kettering, secretary, and W. H. Runkle, manager.

OPINION AND COMMENT

TRAIN DISPATCHING BY TELEPHONE

THE resistless march of progress is always taxing the existing order of things to the utmost, and entailing ever increasing responsibility, but in compensation it is constantly placing at our command better facilities. To increasing transportation possibilities, and the demand for the highest speed and amplest accommodation, can be traced the origin of the awful railway casualties of the past few weeks. But with the endeavor to satisfy the craze for velocity, has an equal effort been made to secure corresponding safety? Methods of handling trains adequate for twenty miles per hour, will by no means apply to the *"twenty hour limited,"* and in the struggle for swiftness and luxury in railroading, have increasing methods of safe-guarding been adequately and carefully considered? When it took a day to go from New York to Boston, and one daily train could handle the traffic, the telegraph was all-sufficient, but with expresses flying a hundred feet per second, following each other with but a few minutes' headway, it seems imperative for the train dispatcher to have his hand practically on the throttle of every engine. He should be able to communicate instantly with any of the engine drivers which may be occupying the line, rather than trust to the slower and remoter possibility of catching a train with a telegram at the next station. Elsewhere in this issue we describe some German experiments looking towards a system of train service controlled by telephone. This system seems to be almost perfect, for not only can the dispatcher signal and talk with any engineer, but he may automatically apply the brakes and bring all engines to a standstill. To be sure the system depends upon a third rail, to which the objection of expense will be advanced, but is not a Westfield horror more costly? Certainly the three-quarters of a million damages that the New York Central has paid so far for the tunnel disaster of last winter would go far towards equipping its tracks. In this respect the street railway men are setting steam road managers a good example. Many of the largest electric railways, operating hundreds of cars at headways measured by as many seconds as the steam roads give minutes, and running at speeds of forty to sixty miles per hour, have complete telephone systems for dispatching, and by this means operate the entire road. Wireless telephony is not in sight, but many of the inductive methods could undoubtedly be successfully applied to avoid the use of the third rail. Railway men usually argue that as the telephone leaves no record there is, in case of accident no possibility of locating responsibilty, or of showing that the orders supposed to be transmitted, and those which are asserted to have been received are identical. But why not bridge the telephone line with a phonograph, or better still with the marvelous Poulsen magnetic wire, which so faithfully records every word uttered in a permanent form and so clearly that the voice of the speaker is infallibly recognized. Surely this is far better evidence than could possibly be offered by any written telegram which must always be handicapped by the possibility of error in sending, receiving, delivering and reading.

An extension of the telephone along these lines means much new business to the telephone manufacturers and incidentally to the operating companies. If the railroad men are too indifferent or too dull to see its manifest advantages, the telephone men should force the facts on their attention. They will thereby not alone serve their own interests but add as well to the safety of the travelling public.

TELEPHONE OPPORTUNITIES UNDEVELOPED

AN instance of the telephonic opportunities that are lying dormant in various parts of the world is given in the prospectus of the Delagoa Bay Development Corporation, a company with a capital of $1,500,000, formed to acquire certain properties and concessions at Lourenzo Marquez, "and generally to take part in the industrial and commercial development of Delagoa Bay." Delagoa Bay, the name of the town is Lourenzo Marquez, has been prominent in the world's affairs for some time past; it is the finest harbor in South Africa, and is the natural port for the Transvaal, being only 55 miles from the Transvaal border. The distance from Delagoa Bay to Pretoria is only 349 miles, as against 1,040 miles from Capetown to Pretoria, and as regards several other important industrial centres in the Transvaal, Delagoa Bay is even more favorably situated as regards distance than Capetown. Lourenzo Marquez is a Portuguese possession, but whether it will always remain so is doubtful; in any case now that South Africa is settling down a great future awaits it.

Among the properties and concessions acquired by the Delagoa Bay Development Corporation is the Companhia dos Telephones de Lourenzo Marquez (which the prospectus kindly explains is the Telephone Company of Lourenzo Marquez) which has a capital of $100,000, and an important site of nearly 9,000 square feet, on which the telephone exchange is situated. "The company owns the telephone system, which is worked under a government concession, and is subject to a payment to the government of three per cent. of the gross earnings. The present installation is an incomplete one and requires to be brought up to date, the number of subscribers being only 85. The directors are advised that this number can be increased to 285, and it is intended at once to reorganize the service on lines laid down in a report made by Mr. C. W. Methven, of Durban." These are the words of the prospectus, and they stagger the imagination with the ambitious scheme of telephonic development that they promise for Delagoa Bay. An increase of 200 stations, nearly 250 per cent. of the present "incomplete" system sounds almost too startling, notwithstanding that no period of time is mentioned in which the increase is to be attained. Mr. C. W. Methven, of Durban, may be an ambitious telephone engineer, but at any rate he is cautious.

Taking apart, however, this Telephone Company of Lourenzo Marquez is a good instance of the telephonic opportunities that exist in many unconsidered corners of the earth. Here is a telephone company with a capital of $100,000 and a site for its exchange covering 9,000 square feet, serving eighty-five subscribers. An English company takes it over and calls in an English expert to report on the possibilities and he reports that the number of subscribers can be brought up to two hundred and eighty-five. That he did not throw in the odd fifteen and make it an even three hundred does credit to his conservatism. But if Lourenzo Marquez is really to become the important commercial centre that the natural advantages of Delagoa Bay should make it, there should be room there for several times three hundred telephones. A good-sized village will support a system of three hundred telephones. A flourishing port, with its warehouses, docks and various commercial establishments, and with a growing and busy population, should have users for ten times three hundred telephones. Modern methods—good service, low rates and energetic management—would make very different plans for the future telephone system of Lourenzo Marquez than those of the Durban expert and the Delagoa Bay Development Company.

CONTEMPORARY CROSS TALK

By The Listening Key.

WE were talking last of the difficulty of adequately fixing rates before actual experience has been had of the cost of producing the service. That this difficulty is now receiving more serious recognition than formerly, is quite apparent from the recent discussions on the subject of rates. There is evidently abroad a feeling of doubt and uncertainty, and while many prejudices difficult to overcome, still exist to block the wheels of progress, there is a growing impression among the more thoughful and observant members of the telephonic profession, that the prevalent method of adopting maximum rates is based upon wrong principles. This impression will grow stronger as the use of the telephone grows greater and the evil results of uniform rates are driven home with increasing force. At the present time, very few people, comparatively speaking, use the telephone, and those few use it, also comparatively speaking, very little. But we are fast approaching a time when almost everybody will use the telephone and when a large proportion of those who use it, will use it a great deal. The city telephone system of ten years hence will bear very little resemblance in any of its essential features to the city telephone system of ten years ago. It is a poor preparation for the business of the next decade to adopt for its management the views and methods which sufficed for the very different business of the past decade.

* * *

This is perhaps the most vital point--that the whole business is changing—and unless this is thoroughly recognized, the old mistakes that did so much to check the progress of the business during the era that is closing, will be repeated over again. The greatest of these, the father of all telephonic mistakes, is the flat rate. There are many arguments in favor of the flat rate. Unfortunately they are all based on the misleading average, and, in addition, on the conditions of ten or twenty years ago, which hardly exist to-day and certainly will not exist ten or twenty years hence. What we do to-day must be done more with an eye to the possibilities of the future, than with any thought of following the methods of the last century. The flat rate is supported by arguments something like these: Every subscriber uses about the same amount of line and every subscriber's station is the same and costs about the same to keep up, whether it be used much or little, and further, every subscriber requires the same amount of switchboard plant. So far, so good. Looking at the question from this point of view, purely from the point of view of averages, the case for the average flat rate seems to be pretty well established.

* * *

Then we come to the question of traffic and although every telephone man knows that there is a wide variation between different subscribers, still a very fair argument can be made out in favor of the flat rate even here. It is based simply on the small cost of handling the traffic, as far as the actual exchange operating is concerned. For the sake of example let us say that the smallest user makes an average of one call a day and the largest user an average of a hundred calls a day. There will be very few of these extremely busy subscribers, a greater number who use from fifty to one hundred calls a day, and still greater number whose daily use falls between twenty and fifty calls a day and a very fair proportion of the total who use from ten to twenty calls a day. More than half of the total subscribers will have an average use of below ten calls a day and at least a third of below five, so we will take the average daily use of all at twelve calls. Assume the average cost of operating a call in a single exchange system to be one-fifth of a cent. Then the average cost of traffic per subscriber is 2.4 cents a day, or at 300 working days in the year, $7.20 a year.

* * *

If the case is argued in this way, that you have got to have your exchange and your wire plant and your subscribers' stations and all the miscellaneous and auxiliary apparatus, that you have got to construct and install all this and keep it in order anyhow, whether the subscribers talk or not, and if they do talk that the average cost per line of enabling them to talk to each other is only $7.20 a year, which is a small proportion of the total cost of maintaining that average line, then you have made out a pretty strong case in favor of the flat rate. You have further the minor advantages, which, however, possess their measure of importance, of a uniform rate, of simplicity of accounting and bookkeeping and of a straightforward system of operating, unhampered by the necessity of recording and counting calls. It is, in fact, the recording and counting of calls and the complicated bookkeeping required by the message rate system that so many telephone men balk at.

* * *

But let us look a little more closely at our hypothetical case. We have said that the traffic will range from an average of about one call a day to an average of about one hundred calls a day among the different subscribers. Even at our low imaginary figure for actual cost of operating, of one-fifth of a cent a call, this would mean that the traffic of the small user was costing only sixty cents a year while that of the very busy subscriber was costing sixty dollars a year. At an average of fifty calls a day the traffic of a single line would cost thirty dollars a year, as much as the rate charged, in many cases more. This clearly means that the small user, whose traffic costs only a dollar or so a year to handle is helping to pay for the cost of handling the traffic of the big user. That is obviously an unfair proposition, and moreover it is an unbusinesslike one. The practice of giving the big man more than his money's worth and of making a number of small men contribute so as to prevent the supplier from losing money on the big man's service is a false method of doing business that is followed in telephone work alone. It has arisen entirely from the erroneous idea which telephone men have so long clung to, of basing rates upon averages.

* * *

In our imaginary cost of handling traffic we have taken a very low figure for exchange operating, one-fifth of a cent a call. If a figure more nearly in accord with actual conditions in cities, say from half a cent to a cent a call, be taken, with the same variation in traffic, the argument against the flat rate receives very much stronger support. At half a cent a call the traffic expense of a line used to the extent of one call a day will be a dollar and a half a year, that of the line using a hundred calls a day, one hundred and fifty dollars a year, an enormous difference. The higher the cost of operating the traffic the more glaring does the injustice of the flat rate become, and the more obviously unpractical is this method of charging for telephone service. As has been shown very clearly by Mr. Abbott there will be considerable variation in the cost of handling traffic in different places, the highest cost being reached in large cities where wages are high and where the greater part of the traffic passes through two central offices. There will also always be differences of opinion among telephone men as to which of the various items of telephone expense should be charged wholly or partly to maintenace and which wholly or partly to traffic. So that the traffic expense is a variable item in itself, as between different places, and it is also subject to variation according to the method of bookkeeping or, more properly speaking, the system of apportionment of expenses adopted in calculating operating costs.

* * *

For example, as regards the first point it is clear that the traffic will cost more to handle in a place where the operators' wages average seven dollars a week than in a place where they average five only. It is also quite clear that the traffic will cost more to handle in a system having two or more exchanges than in a single exchange system. In the former case a proportion of the calls will be handled by two operators instead of by one only, and every call so handled must bear its share of the cost of keeping up the extra central office and line plant requisite for trunk workings. So that there can be no question that the cost of handling the traffic varies in different places. Even the most confirmed flat rate adherents admit that, and recognize the principle in their tariffs. But when it comes to apportioning expenses between operating and maintenance there is room for wide diversity of opinion, and it is lucky that there *is* room, for the widest diversity of opinion exists. Your dyed-in-the-wool flat rater would argue that, allowing a certain average amount for operating each station, based practically on a division of the operators' wages by the number of subscribers, every other item of expense would be maintenance pure and simple. "You cannot have a telephone system without an exchange, lines and subscribers stations," he says; "you have got to maintain your exchange whether your subscribers talk much or little, and we allow for them talking an average amount; you have got to maintain your stations whether your subscribers talk much or little and the cost will hardly vary between the station that is in use all the time and the station that is used once in a blue moon; and there will not be a cent of difference in the cost of maintenance of a wire whether it is kept "red-hot" with talking or whether its molecules are guiltless of vibrating to an electric wave from one year's end to another. Message rates," says he, "Bah!"

"LETTERS FROM A SELF-MADE MERCHANT TO HIS SON"

By George Horace Lorimer.

It isn't often that a popular book has special interest which justifies its review by a technical paper, but now and then such a work appears. When it does there is generally in it matter that is of more importance to the technical man than is found in books bearing directly on his profession. Such popular books as measure up to this standard, carry messages of human interest and business philosophy in a form that appeals to every one, a most invaluable service, for these qualities, so essential to success, are only too apt to dry up in the atmosphere of professionalism. Such books are the best, in fact, the only antidotes for the narrow view and restricted horizon with which many of the ablest technical men are afflicted.

Naturally books of this character are rare. Sometimes they do not appear once in five years. But when they do come, they bear ear marks not to be mistaken. If they cannot be told off in any other way, there is always one unfailing sign. This sign is found in the avidity with which the technical papers take such books up.

That "The Letters of a Salf-Made Merchant to His Son" belongs to the exceptional class of human, helpful books, is shown by the fact that many of the important technical journals have already reviewed it in their columns, though it is only a short time off the press. Another proof is that in that short time 70,000 copies have already been printed. At the rate it is going, the hundred thousand mark will probably be passed within three months, a record almost without a parallel.

The author of the book is George Horace Lorimer. The secret of his success is to be found probably in a combination of qualities that is very rare. He is at once a successful business man and a great editor. Though still a very young man, having just passed his thirty-fourth year, he has to his credit the building up of a great branch of industry under the late P. D. Armour, and the building up of a great magazine. At the height of his business success he resigned from the Armour establishment to go into literature. Several years ago he became the editor of *The Saturday Evening Post,* and almost from the date of his advent, there began that phenomenal circulation growth that has carried *The Saturday Evening Post* into every town and hamlet in the United States. "The Letters" show plainly the make-up of the author. They are written in a broad, clear, blunt style, full of anecdote, humor, wit, and fairly overflowing with keen worldly philosophy. It is the philosophy that has built up a great industry and controlled the produce markets, for the "Self-Made Merchant" is old John Graham, a millionaire packer of Chicago. The letters are written to Graham's son Pierrepont. At first Pierrepont is at college; afterward he enters his father's employ, and through the letters, the young man's whole career in business and in love is traced in a delightfully interesting manner. If every young man and every old one, could or would read these letters they would learn a lot in the way of winning the mighty dollar, and incidentally reap a great harvest of amusement. For in old man Graham we have at once the shrewdest, kindliest and wisest of men, the sort of men who have made America great, the real American business man. Many volumes have been written both by native and foreign writers in an attempt to describe this sort of an American, but they are all clumsy portraits, beside the work of Mr. Lorimer, who has adroitly woven into the letters an autobiography of Graham, as well as a character sketch of Pierrepont and a description of the best business systems of to-day.

"The Letters" may be opened almost anywhere with the assurance that a sparkling bit of wisdom will come to hand.

"Beauty is only skin deep," writes the old man on one occasion, when he is advising Pierrepont on the subject of marriage, "but that's deep enough to satisfy any reasonable man."

Here is an extract that some telephone theorists may take to heart:

> "Some men learn all they know from books; others from life; both kinds are narrow. The first are all theory, the second all practice. It's the fellow who knows enough about practice to test his theories for blowholes that gives the world a shove ahead and finds a fair margin of profit in shoving it."

In some of his other letters the old man gives vent to the following choice bits:

> "I noticed, too, when you were home for Easter that you were running to sporty clothes and cigarettes. There's nothing criminal about either, but I don't hire sporty clerks at all, and the only part of the premises on which cigarette smoking is allowed is the fertilizer factory."
>
> "I hear a good deal about men who won't take vacations and who kill themselves by overwork, but it's usually worry or whisky. It's not what a man does during working hours, but after them, that breaks down his health. A fellow and his business should be bosom friends in the office and sworn enemies out of it."
>
> "When I was a young fellow and out of a place I always made it a rule to take the first job that offered, and to use it for bait. You can catch a minnow with a worm, and a bass will take your minnow. A good fat bass will tempt an otter, and then you've got something worth skinning."
>
> "I want you to learn right at the outset not to play with the spoon before you take the medicine. Putting off an easy thing makes it hard, and putting off a hard one makes it impossible."
>
> "There is one excuse for every mistake a man can make, but only one. When a fellow makes the same mistake twice he's got to throw up his hands and own up to carelessness or cussedness."
>
> "A business man's conversation should be regulated by fewer and simpler rules than any other function of the human animal. They are:
>
> "Have something to say.
>
> "Say it.
>
> "Stop talking."
>
> "It's all right when you are calling on a girl or talking with friends after dinner to run a conversation like a Sunday-school excursion, with stops to pick flowers, but in the office your sentences should be the shortest distance possible between periods."
>
> "Remember, too, that it's easier to look wise than to talk wisdom. Say less than the other fellow and listen more than you talk, for when a man's listening he isn't telling on himself and he's flattering the fellow who is. Give most men a good listener and most women enough notepaper and they'll tell all they know."
>
> "A man's got to keep company a long time and come early and stay late and sit close before he can get a girl or a job worth having. There's nothing comes without calling in this world, and after you've called you've generally got to go and fetch it yourself."

Philosophy like that, and the book is simply alive with it from cover to cover, is worth many years of experience if taken to heart. Since the book has been published, hundreds of copies have been purchased by large employers for distribution among their clerks and heads of departments. A reading of "The Letters" makes clear why.

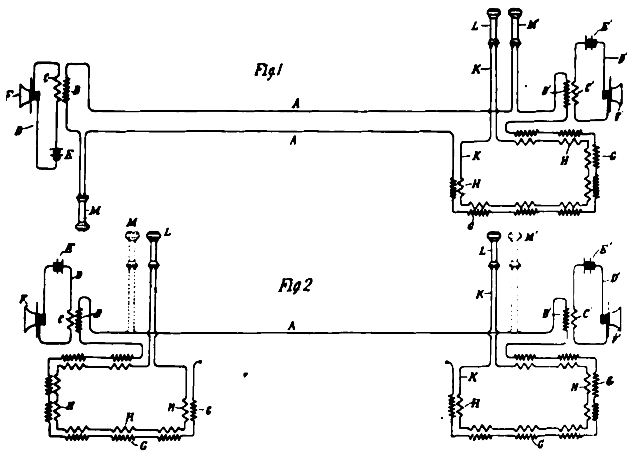
Editor's Note.—This is the first of a series of book reviews that will appear from time to time.

IMPROVED TELEPHONE SYSTEM.

Charles G. Burke, Brooklyn, N. Y., patents (No. 719,432) and assigns one-half to J. Q. A. Whittemore, Boston, Mass., telephonic apparatus, illustrated in Figs. 1 and 2. The subject of this invention is an improved telephone system, capable of reproducing more distinctly and audibly the words spoken into the transmitter. It consists in adding to any telephone line, *A,* a number of induction coils, *G, H, K* and *I,* placed in series in a local circuit, containing a second receiver, *L.* There then will be two receivers, *M* and *L,* in the system, one of which is arranged in the usual manner, while the receiver, *L,* is in the local circuit containing the previously mentioned induction coils. The inventor claims that by this means greater clearness and volume in articulation is secured. He also claims, as is shown in Fig. 2, that transmission may be effected by means of a single wire, with no return either grounded or otherwise.

COMBINED TELEGRAPH AND TELEPHONE SYSTEM.

Charles H. Gaunt, St. Paul, Minn., patents (No. 719,458) and assigns one-half to Oscar C. Greene, a combined telephone and telegraph system, illustrated in Fig. 1. The telephone system uses the ordinary bridging bells installed in the usual manner. Wherever a telegraph station is desired, the inventor bridges the line with a high-wound double retardation coil, *10*, to which the telegraph battery and key is attached in the centre. Thus both sides of the line form one side of the telegraph line with a ground return, while the telephone line is completely metallic. The retardation coil prevents the telegraph apparatus from short-circuiting the telephone line.



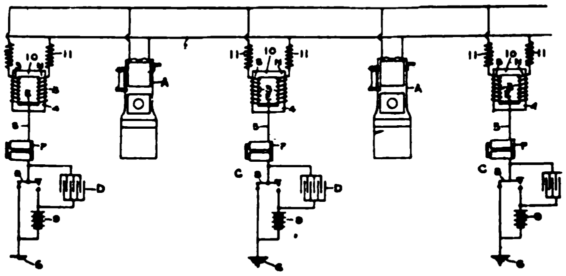
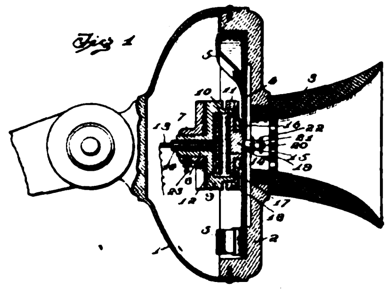


FIG. 1.

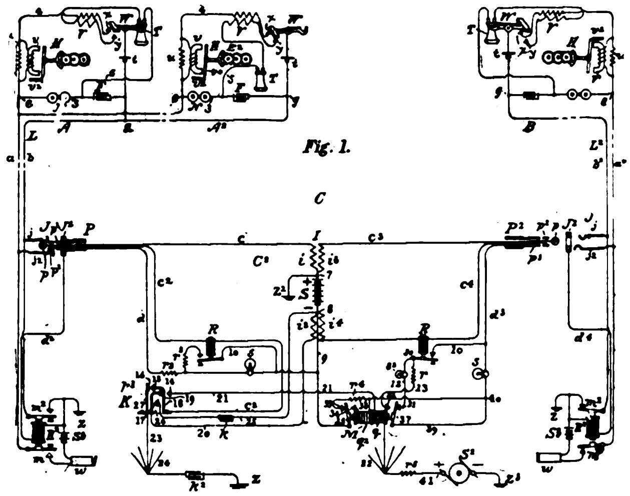
NEW TRANSMITTER.

James A. Wotton, Atlanta, Ga., patents (No. 719,972) and assigns to the Wotton Electric and Manufacturing Company a telephone transmitter. This invention covers an improvement in telephone transmitters, to obviate previously experienced difficulty in connecting the electrodes with the line wire, and is shown in section in Fig. 1. The improvement consists in the manner in which the electrodes are connected to the carbon plates which enclose the granular carbon in the transmitter. The inventor insulates the fixed carbon plate by surrounding the stem of the disc, which carries the rear carbon, by an insulating bushing, *14*. He is then enabled to secure the movable carbon plate to the diaphragm by means of a thin sheet of brass and thus secure greater solidity and permanence in the construction.



SERVICE METER SYSTEM.

A. M. Bullard, Somerville, and Lewis A. Falk, Boston, Mass., patents (No. 719,736) and assign to the American Telephone and Telegraph Company, a service meter system and apparatus for telephone exchanges. The object of this invention is to secure a counting and registering appliance, capable of operating satisfactorily at the sub-stations, to count the number of completed connections. Essentially it consists of an electro-magnetic mechanism, *H*, at the sub-station, consisting of a series of dials and an escapement that is operated by the electro-magnet, *V*. This electro-magnet is so wound that the ordinary battery and ringing current which passes over the subscriber's line will not affect the magnet, but a special generator, *41* is provided, wired to the operator's cord circuit and under the control of the operator by means of a key. This special generator is of a different polarity and a greater voltage than either the line or the ringing current, and to the current supplied by this generator the electro-magnet, *V*, will respond. It is, therefore, within the operator's power to actuate this magnet and record every completed connection at each subscriber's sub-station.



TELEPHONE POLE.

William J. McCarthy, Peshtigo, Wis., patents (No. 719,841) and assigns one-half to William D. Mellen and Henry J. Callaghan a telephone pole. The object of this patent is to provide an improved pole for supporting both telephone and telegraph lines, and, as is shown in Fig. 1, consists of a wooden base to which angle irons are bolted that form the pole proper.

FIG. 1.

Queries

ALTERNATING CURRENTS.

When an alternating current flows through an induction coil or condenser and meets a current from a common battery, will it resist the current it meets and neutralize, if of equal strength; and will it also add to the strength of the current in the same direction? Does the battery current under these circumstances help or resist the alternating current?

F. W. S.

An alternating electro-motive force, supplied to a conductor having a steady electro-motive force, may reduce, neutralize, overpower or reinforce the steady electro-motive force, depending upon the relative strengths.

The Week's Messages.

NEW COMPANIES

ESCONDIDO, CAL.—Under the leadership of Dr. G. M. Bumgarner, the people of this place are organizing an Independent telephone company to furnish local service.

RIFLE, COLO.—The Rifle Creek Telephone Company has been incorporated by C. J. S. Hoover, Richard Parris, George E. Clarkson, Benjamin H. Thompson and Elijah R. Parker; capital stock, $10,000. Offices in Rifle.

ALGONA, IA.—The East Union Telephone Company has been organized by people of Union County. G. L. Carroll was elected president, J. B. Hofius secretary and Frank Reibhoff treasurer. The charter members so far are W. F. Jenkinson, Geo. W. Boevers, Ricker Bros., J. B. Hofius, Myron Schenck, Frank Reibhoff, Jas. Cruickshank and G. L. Carroll.

ARION, IA.—The Arion Telephone Company has been incorporated with a capital stock of $10,000. Incorporators: J. L. Maurer, W. B. Evans, E. R. King and W. B. Nelson.

BRITT, IA.—The Hancock County Rural Telephone Company has been organized with a capital of $100,000. Headquarters at Britt.

CEDAR FALLS, IA.—The preliminary work for the organization of the Farmers' Mutual Telephone Company for this section has progressed so far that a meeting will be held here in a few days at which articles of incorporation will be drawn up and adopted and officers elected. The company promises to start with a heavy guaranteed patronage. The business men of Cedar Falls are lending all encouragement possible to the enterprise.

EMMETSBURG, IA.—The Northwest Independent Telephone Association has been organized here. The officers of the association are: President, Dr. G. W. Graves, Spencer; vice-president, G. W. Sanborn, Fonda; secretary and treasurer, W. Ferguson, Rolfe. The purpose of the association is to hold periodical meetings and discuss matters of interest in the telephone business. It is expected that soon fully twenty companies will be represented in the association and the prospects are good for a through service all over the northwest portion of the State in a very short time. It is said the consolidation will not increase rates, and that, if anything, it will have the effect of decreasing the cost to customers.

McCALLSBURG, IA.—The Short Line Telephone Company, headquarters here, has been incorporated with a capital stock of $5,000. Incorporators: F. M. Boardman, Nevada; A. N. Drake, R. B. Ballard, of Radcliff.

NORTH LIBERTY, IA.—The North Liberty Mutual Telephone Company has been incorporated. Incorporators: A. L. Moreland, Geo. Anderson, T. E. Fountain, L. L. Stoner and R. W. Wray. Capital stock, $10,000.

POSTVILLE, IA.—The Farmers' Mutual Telephone Company, of Postville, has been incorporated; capital, $5,000. Evan Swenson, president; H. D. Webb, secretary.

EDWARDSVILLE, ILL.—A number of farmers near here and around Peters have organized a telephone company, and propose to construct a system. The board of directors consists of John Feldman, president; William Dickman, vice-president; J. F. Dickman, secretary; August Brockmeier, treasurer; Ed. Brockmeier, Henry Viere, C. Rathert, August Klingman, Ed. Kramer and August Stegemeier, directors.

BROWNSVILLE, IND.—The Brownsville Co-operative Telephone Company has been incorporated with a capital stock of $2,000. It will operate in Union, Fayette and Wayne counties.

DOOLITTLE MILLS, IND.—The Eckerty, Carrollton and Branchville Telephone Company has been incorporated with a capital of $2,000 to operate in Perry, Crawford and adjoining counties. Incorporators: J. A. Doolittle, W. T. Lynch, Doolittle Mills, Henry W. Rohl, C. C. Saalman, T. H. Frakes, Branchville; E. H. Mason, Uniontown; D. T. Taylor, Lasher; Wm. H. Goldman, J. R. Lyons, Wm. G. Willis, West Fork; John B. Groves, T. C. Duffin, St. Croix.

MANSFIELD, MASS.—A movement is on foot here to organize an Independent telephone company to compete with the Southern Massachusetts Telephone Company.

BETHEL, ME.—The Androscoggin Lakes Telephone and Telegraph Company, Bethel, has been incorporated, for owning and operating a telegraph and telephone line; capital, $5,000. President, S. F. Peaslee; treasurer, Chas. Chase, both of Upton, Me.

JASPER, MINN.—The Jasper Telephone Company has been incorporated; capital stock, $1,500. Incorporators: W. W. Stearns, Alexander Mitchell, E. P. Le Sueur, P. O. Olson, M. D. Martin, I. Turner, S. S. King, A. W. Jameson, Andrew Carlson, J. H. Berg, John Peterson, J. H. Taylor and Andrew Rae.

HOLLIDAY, MO.—Under the leadership of W. Smith Jones, the people of this place are organizing an Independent telephone union for the purpose of giving local service. Several meetings have been held and others are scheduled for the future, at which an organization will be affected.

UNADILLA, NEB.—A move is on foot among the farmers south of town to organize a telephone company which will probably be known as the Farmers' Mutual Telephone Company. A meeting will be called in the near future to discuss the possibilities of such an organization.

CAMERON, N. Y.—The Dickey Telephone Company, of Cameron, has been incorporated; capital, $170. Directors: Fred. Sherer, Charles Loughry and Charles I. Smith, of Cameron.

CANAAN, N. Y.—The Canaan and Chatham Co-operative Telephone Company has been incorporated to operate in Columbia County. Its principal place of business is to be in Canaan. The capital stock is $1,000. The directors are A. B. Howes, F. C. Goodrich, Sr., A. D. Bartlett, A. H. Ford, of East Chatham, and S. L. Gifford, of Canaan Four Corners.

EDMESTON, N. Y.—The Edmeston and Winfield Telephone Company has been incorporated to extend from Edmeston to West Winfield, through the towns of Burlington and Exeter, connecting the towns of Edmeston, Burlington and Exeter, Otsego County, and the town of Winfield, Herkimer County, and extending from those towns in the counties of Otsego, Oneida and Herkimer. The capital stock is $2,000. Directors: Clayton Cole, of Winfield; D. J. Wood, Ed. L. Morris and Jerome B. Wolcott, of West Exeter; Dorr J. Webster, Charles H. Link and D. F. Arnold, of Burlington Flats, and George Flynn, of Edmeston.

MOUNT MORRIS, N. Y.—The Mount Morris Telephone Company has been incorporated with a capital stock of $10,000. Directors: W. E. Spencer, of Nunda; F. A. Warm and Flora E. Warm, of Mount Morris.

WYOMING, N. Y.—The Perry Telephone Company has been incorporated with the following board of directors: C. M. Smith, W. W. Grieve, L. P. Benedict, C. A. Toan, F. D. Fanning, C. W. Smith and C. G. Clark. The officers of the company are: President, C. M. Smith; vice-president, Charles A. Toan; secretary and treasurer, L. P. Benedict; manager, C. W. Smith. The capital stock of the company is $10,000.

ATHENS, OHIO.—The Apple Blossom Telephone Company has been organized, with John Parmiter, president, and Frank Moore, secretary and treasurer. The line will extend through the locality known as Sand Rock, and is being built under the supervision of Hebron H. Henry.

McCOMB, OHIO.—The McComb Home Telephone Company has been incorporated by A. L. Fritchie, J. C. Bright, J. R. Shoop, C. O. Duvol, F. A. Griffin and L. Cusac. Capital, $20,000.

RAVENNA, OHIO.—The Portage County Telephone Company, headquarters here, has been incorporated with a capital stock of $100,000. Incorporators: F. E. Smith, S. D. Brown, J. E. Bowman, Francis Siebling, W. E. Slabaugh.

AMARILLO, TEXAS.—The Amarillo Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are D. C. Stegman, R. L. Stringfellow and J. L. Smith.

MUHLENBURG, PA.—Charles Wheeler is making efforts to raise funds to build a telephone line from Muhlenburg via Roosevelt to Lamburg to Irish Lane and Bloomingdale, and from Muhlenburg to Shickshinny.

CLEBURNE, TEXAS.—The Cleburne Telephone Company has been incorporated with a capital stock of $60,000. The incorporators are F. M. Kirby, B. C. Allen, A. C. Campbell, J. H. Keith and F. B. McElroy.

THE WEEK'S MESSAGES—Continued.

WICHITA FALLS, TEXAS.—The Texas Telephone Company, of Wichita Falls, has been incorporated with a capital stock of $48,000. The incorporators are J. J. Lory, C. E. Felder, A. Zundellowitz, A. H. Carriongton and J. C. Hardin.

MONTEVIDIO, URUGUAY.—The Uruguay Government has approved the statute of La Economica Telephone Company, represented by Senors A. C. Mendez anl M. J. Perez, of Montevidio.

RANDOLPH, VT.—The Randolph Telephone Exchange has been organized with the following officers: President, H. W. McIntyre; secretary and treasurer, Dr. H. H. McIntyre; executive committee, Dr. H. H. McIntyre, H. W. McIntyre and Dr. George W. Scott. The company intends to install one hundred instruments this year.

SAGOLE, WIS.—Appleton and Freedom Telephone Company, with principal office in Sagole, Town of Freedom, has been incorporated with a capital stock of $1,200. Incorporators: Nicholas Leisch, Edward H. Staeben, Patrick Coffey and Henry Van Suesteren.

FINANCIAL.

FORT DODGE, IA.—The Fort Dodge Telephone Company has increased its capital stock from $50,000 to $100,000.

BOSTON, MASS.—The New England Telephone and Telegraph Company has declared its regular quarterly dividend of 1½ per cent, payable February 16 to stock of record January 31.

BENZONIA, MICH.—The Benzie County Telephone Company has declared an 8 per cent dividend, to be paid out of the net earnings for the year 1902. The capital stock of the company is to be increased from $20,000 to $50,000.

KANSAS CITY, MO.—A deed of trust for $3,000,000 has been filed in the office of Register of Deeds in Kansas City, Kan., by the Kansas City Home Telephone Company. The deed of trust is made to the Germania Trust Company, in St. Louis, and calls for bonds to construct a conduit telephone system in the two Kansas Citys. There are to be three classes of bonds: Two thousand bonds with a face value of $1,000; 1,500 with a face value of $500, and 2,500 valued at $100 each. The bonds will draw 5 per cent interest.

ROME, N. Y.—Manager Hall, of the Rome Home Telephone Company, has filed his annual report for the past year, showing that there are now over 900 telephones in service here, the receipts being $16,072.12, the disbursements, $7,519.73, and the balance, $8,552.39; bond interest, $5,500, and the total net earnings, $3,052.39.

CLEVELAND, OHIO.—The gross receipts of the United States Telephone Company for the year 1902 were $312,717. The net earnings have not yet been figured, but as the company operates for about 55 per cent, they are in the neighborhood of $140,000. The company has outstanding $1,865,000 of 5 per cent bonds, and the fixed charges would thus far be $91,250, leaving about $47,000 surplus for stock. The company is now earning at the rate of over $60,000 surplus for stock.

PHILADELPHIA, PA.—Notice has been sent to the State Department of an increase of indebtedness by the Keystone Telephone Company from nothing to $2,500,000.

FRANCHISES.

WALLACE, IDAHO.—The members of the Coeur d'Alene Telephone Company, which expects to operate throughout this section of the country, have elected these officers: L. Prager, of Murray, temporary president, and Jacob Lockman, of this city, secretary. At the next meeting of the City Council of Wardner the company will ask for a franchise to operate in that city. At a meeting of the Council of Wallace an application was made for a franchise here.

CHAMPAIGN, ILL.—The Home Telephone Company has asked for a franchise for thirty years dating from the time the ordinance is passed. The company's present franchise is good for twelve years yet, but extensive improvements are contemplated and the promoters do not care to invest unless they are sure of permanency. It is the intention to place all wires in the business district in underground conduits and thus do away with many unsightly poles.

SPARTA, ILL.—A representative of the Mutual Telephone and Telegraph Company will appear before the City Council of Sparta the first Monday in March and ask for a general telephone franchise. There is also a representative of a private corporation in St. Louis, Mo., who will appear before the City Council at the March meeting and ask for a general franchise.

GREENCASTLE, IND.—The City Council has granted a franchise over certain streets to the Putnam County Co-operative Telephone Company, which gives it the desired entrance into the city.

MONTEREY, MEXICO.—John Woessner, of Saltillo, former United States Vice-Consul at that place, has secured from the Federal Government a concession for the establishment of long-distance telephone lines throughout the republic. The concession provides for exemption from taxation for twenty years.

WILLIAMSTON, MICH.—The Village Council has granted a franchise to the Ingham County Co-operative Telephone Company. Curtis Beeman, of Leroy, is president and Charles J. Dakin, of Ingham, secretary of the company.

GENEVA, NEB.—John Barsby, of Fairmont, has been granted a franchise by the city of Geneva for an Independent telephone exchange, and a good subscription list has been secured. Work will begin as soon as all preliminaries can be settled. The conditions of the grant require that the central station be located here and the manager reside in Geneva.

BLOOMDALE, OHIO.—The Bloomdale Council has granted the Home Telephone Company of Toledo a franchise to construct and maintain a telephone exchange. Work on the plant will soon be inaugurated.

CINCINNATI, OHIO.—*The Enquirer* reports that W. Brown, registered as from Dayton, Ohio, but with headquarters at Buffalo, N. Y., is at the Dennison Hotel, Cincinnati, his purpose being to secure a franchise for an Independent telephone company.

CINCINNATI, OHIO.—The right of the Fitzsimmons Telephone Manufacturing Company to string wires in this city is again to be passed upon by the Corporation Counsel at the request of the Board of Public Safety. The company claims it does not need a franchise from the city, having been granted one by the Probate Court.

McCOMB, OHIO.—The Mutual Telephone Company has been granted a franchise here. The Bell Telephone Company's petition for a franchise was tabled indefinitely.

CAMDEN, N. J.—The Eastern Telephone and Telegraph Company has been granted permission to string wires and erect poles on the streets of Palmyra Township, with the exception of Broad street, where it must construct an underground conduit.

FORT WORTH, TEXAS.—J. A. Elliott and others have asked the Council of North Fort Worth for a franchise to construct and operate a telephone system.

RATES.

LANSING, MICH.—The Citizens' Telephone Company has increased rates for service to the limit allowed by its franchise because of the rapid growth of its business. At present there are over 1,600 subscribers. The exchange has room but for another hundred before it will be necessary to add new switchboards.

ELECTIONS.

BICKNELL, IND.—The Bicknell Telephone Company, which recently purchased the interests of E. D. Miller, who started the enterprise in June, 1901, has elected the following officers: President, J. H. Barr; vice-president, W. L. Lemen; secretary, John S. Hoover; treasurer, Frank McClure; manager, E. D. Miller. R. D. Barr, G. D. McClure and W. S. Kensler are also on the Board of Directors. The company has now seventy-five miles of wire up and toll connection with the principal Independent companies of the State. It has 110 subscribers.

AURORA, NEB.—The annual meeting of the stockholders of the Hamilton County Telephone Association was held here recently. Officers and directors were elected as follows: D. L. Toof, president; J. B. Cain, secretary; F. C. Putnam, treasurer; J. A. Cavett, F. O. Jenison and J. K. Hartnell, directors. The organization was formed less than two years ago, and has put in up to the present time 120 telephones throughout the county and has lines connecting the towns of Aurora, Giltner, Phillips and Stockham.

KEARNEY, NEB.—At the annual meeting of the Home Telephone Company directors were elected for the ensuing year as follows: F. H. Gilcrest, W. J. Stadelman, C. H. Gregg, C. W. Hoxie, T. E. Parmele and W. S. Clapp. The officers will be elected at a meeting of the directors, to be held later.

ANGELICA, N. Y.—At the annual telephone meeting of the Angelica Telephone Company the following officers were elected: President, D. P. Richardson; vice-president, J. T. Brown; treasurer, H. E. Dudley; secretary, C. L. Lathrop. Plans are under way for various improvements along the telephone line.

BAITING HOLLOW, N. Y.—The Baiting Hollow and Roanoke Telephone Company recently held a meeting and re-elected these officers: President, E. E. Mosir; vice-president, Frank O. Reeve; secretary and treasurer, John C. Young. Directors in addition to the officers are: Charles H. Warner, Henry Talmage, Albert B. Young and William R. Fanning. The first annual dividend of 12 per cent has been declared. The line is now being constructed to South Jamesport, and the company officials say that they will be east as far as Mattituck within a year. There are now about 100 telephones on the lines and forty more will be added when the new lines now in course of construction are completed.

ELMIRA, N. Y.—At a recent meeting of the Steuben County Co-operative Telephone Company, held at Bowlby, H. M. Noble, S. E. Wilkes, George Decker, Frank Thomas, C. D. Davis, D. M. White and D. M. Collier were elected directors. The following officers were then elected: H. M. Noble, president; Frank Thomas, secretary; D. M. White, treasurer, and S. E. Wilkes and D. F. Ward, superintendents.

THE WEEK'S MESSAGES—Continued

GENEVA, N. Y.—At the annual meeting of the Geneva Telephone Company the following directors were chosen: B. G. Hubbell, H. E. Merrell, J. B. Anderson, O. J. C. Rose, J. W. Mellen, T. J. Smith, F. S. Bronson, G. W. Loomis and L. G. Hoskins. The officers elected by the directors are: President, B. G. Hubbell; treasurer, H. E. Merrell, and secretary, L. G. Hoskins.

MIDDLEBURG, N. Y.—At the annual meeting of the stockholders of the Middleburg Telephone Company the following were elected directors for the ensuing year: Christopher S. Best, Daniel D. Frisbie, J. Edward Young, Jerome B. Badgley, Albert E. ReQua, Dow Beekman, Charles W. Vroman, John H. Weckel, George L. Danforth, Jacob L. Engle, John H. Cornell, Menzo W. Baker, Wellington E. Bassler, Andrew B. Engle, Lydia A. Becker. The following officers were elected for the ensuing year: President, C. S. Best; vice-president, D. D. Frisbie; treasurer, J. E. Young; secretary, Dow Beekman; attorney, G. L. Danforth; manager, C. W. Vroman; executive committee, C. S. Best, Daniel D. Frisbie, J. Edward Young, Dow Beekman, C. W. Vroman, J. B. Badgley, J. H. Cornell. It was voted to extend the line to Huntersland if proper terms could be made. A dividend of 10 per cent was declared.

WADHAMS MILLS, N. Y.—At the annual meeting of the Westport, Essex and Lewis Telephone Company, held here, the following officers were elected: President, Dana Braisted; secretary and treasurer, E. J. Sherman; directors, Dana Braisted, E. J. Sherman, Charles S. Underwood, Melvin E. Lott, George K. French. A committee was appointed to investigate the feasibility of extending the line to different places.

NEWARK, N. J.—At the annual meeting of the Newark Telephone Company J. B. Curtis was elected president and A. Norton Taylor secretary and treasurer. The Board of Directors is composed of J. B. Curtis, Edward W. Jones, A. W. Dease, H. M. Cross, Henry C. Vance, Clement I. Wilson, J. E. Tench and Charles A. McCleary.

CLEVELAND, OHIO.—The annual meeting of the United States Telephone Company was held recently and the following officers were elected: President, F. S. Dickson, in place of H. A. Everett, retired; vice-president, E. W. Moore; secretary, James B. Hoge; treasurer, R. W. Judd; general manager, Maxime Reber; assistant general manager, H. H. Robinson.

EATON, OHIO.—The Eaton Telephone Company has elected the following Board of Directors: Elam Fisher, L. D. Lesh, C. B. Cokefair, J. A. Gilmore, C. F. Brooke, W. W. Morrison, I. E. Gardner. The directors organized by electing the following officers: President, C. F. Brooke; secretary, L. D. Lesh; treasurer, Elam Fisher. Connections are now made with the new Hamilton exchange, which has 800 subscribers, and almost any point can now be reached in any of the adjoining cities or towns.

NEW PHILADELPHIA, OHIO.—The directors of the Tuscarawas County Telephone Company held a business meeting in this city recently. The stockholders elected a Board of Directors consisting of B. P. Scott, E. Weibenson, N. I. Dryfoos, John L. Kennedy, E. A. Walter, E. R. Van Ostran, Charles Slingluff, George A. Beers, Ed Moody, W. M. Tracy and C. D. Juvenal. The directors elected as officers: B. P. Scott, president; Charles Slingluff, vice-president; E. A. Walter, secretary; John L. Kennedy, treasurer; B. P. Scott, George A. Beers, E. R. Van Ostran, E. Weibenson and E. A. Walter, Executive Committee.

SANDUSKY, OHIO.—At a meeting of the stockholders of the Sandusky Telephone Company the following directors were elected: L. Duennisch, Jacob Kuebeler, J. C. Hauser, John A. Giedeman, C. C. Curtis, Jacob A. Biehl, C. H. Cramer, L. L. Curtis, C. L. Engels, George Feick, J. W. Holland, Sidney Kilbourne and John Whitworth.

BOLIVAR, TENN.—At a meeting of the stockholders of the Progress Telephone Company, a local exchange partly connecting Bolivar with the county, Dr. J. W. Cartwright was elected president and Oscar Black was made temporary manager. G. M. Savage, T. F. Wilkinson, J. W. Cartwright, D. W. Parran, Oscar Black, W. S. Anderson and G. T. Ingram were elected directors.

RICHMOND, VA.—A meeting of the stockholders of the Richmond and Ayletts Telephone Company was held here. The following officers were elected for the ensuing year: William George Pollard, president; J. R. Turpin, vice-president and general manager; J. B. Moor, secretary; George P. Haw, general counsellor; directors, J. R. Turpin, Dr. J. B. Moor, George P. Haw, R. H. Sweet, Dr. Haws Campbell, J. O. Hutchinson and William George Pollard.

ENOSBURG FALLS, VT.—The annual meeting of the Northern Telephone Company was held here, at which the following officers were reelected: President, Dr. W. S. Stevens; treasurer, M. P. Perley; secretary and manager, C. L. Ovitt.

NORTHFIELD, VT.—At the annual meeting of the Northfield Telephone Company the following Board of Directors was chosen: Frank Plumley, W. G. Huntley, C. C. Brill, F. I. Harris, G. R. Andrews. J. H. Talbot was chosen treasurer and C. A. Edgerton auditor. The company is reported in a good financial condition.

GRAND RAPIDS, WIS.—The Telephone Toll Line Company, headquarters here, has elected the following officers: T. A. Lipke, president; C. F. Kruger, secretary and treasurer; William Scott, E. W. Ring, R. L. Krause, K. W. Doege, E. C. Kellogg, directors. It now has in operation over sixty miles of metallic circuits and forty-four instruments. The line earned a total of $1,429.02 during 1902; operating and maintenance amounted to $646.49.

COMPETITION.

NEW DECATUR, ALA.—The Morgan County Telephone Exchange will soon be ready for business. The company has recently put in its switchboard and is now stringing wires. The poles have been up for some time. This company is "bucking" against the Southern Bell, which company has had a telephone system here for several years. The new company has cut the prices of the Southern Bell almost in two, and as a result has secured many subscribers in the city. The Southern Bell has no franchise in New Decatur but is doing business through the American Telephone and Telegraph Company, which company has a franchise through the city for long-distance telephones. The outcome of the contest may result in some interesting developments.

HAZLETON, IND.—Many of the subscribers of the Cumberland Telephone and Telegraph Company at this place are having their telephones taken out because of the unsatisfactory service and the recent raise in rates of from 50 cents to $1.50 for residence telephones and from $1.50 to $2.75 for business houses.

MARION, OHIO.—Some time ago the Marion County Telephone Company placed free telephones in all the school buildings of the city. The Central Union Company's telephones were ordered taken out. Now the Central Union Company makes a proposition to replace its telephones with new ones and charge no rental. The members of the Board of Education have refused to allow the Central Union telephones in the school buildings even if they are furnished free.

BIG SANDY, TENN.—The Dixie Telephone Company has made extensive improvements lately and has succeeded in "wiping" the Cumberland Telephone Company out. The Cumberland exchange was put in last year with twenty-five lines, while the Dixie had only twenty-eight. Now the Cumberland has eleven and the Dixie forty-five, and more lines being built daily. The country people became enthusiastic about telephones and are having them put in as rapidly as possible.

COMBINATIONS.

ATLANTA, GA.—The plant of the Standard Telephone Company in Atlanta may be bought by local capitalists when placed on the block to be sold to the highest bidder, as ordered by the United States Court. While the names of the parties interested cannot be obtained, it is known that a number of Atlanta financiers are preparing to bid on the property. The Standard Construction Company of Philadelphia, which owns the majority of the stock in the company, it is thought will be a strong bidder.

BARNESVILLE, GA.—Referee Proudfit has signed an order authorizing the sale of the J. J. Rogers telephone system. A date for the sale has not been named. J. W. Hanson, of Barnesville, is trustee of the estate. J. T. Laidler, of Macono, holds a mortgage on the telephone plant for about $1,000.

PAWPAW, ILL.—R. A. Wylie, manager of the Northern Illinois Telephone Company, is in Pawpaw for the purpose of purchasing the Pawpaw exchange of the Lee County Telephone Company. The plan which Mr. Wylie is following out is to secure enough subscriptions to the stock of the company to pay for the Pawpaw exchange.

FITHIAN, ILL.—The Fithian Telephone Company, which was owned and built up by U. S. Thompson, has been sold by him to George T. Jones.

VAN BUREN, IND.—D. E. M. Beekman, proprietor and manager of the Van Buren Independent telephone exchange, has sold the system to W. R. Lowe, of Winamac. It is said Mr. Lowe intends to purchase the Warren telephone exchange also, and put in a double exchange.

CONSTRUCTION.

COLLINSVILLE, CONN.—The Farmington Valley Telephone Company, of this place, will install a line in Hudson, N. Y. R. L. Andrews, president of the company, and B. F. Case were in Hudson recently on business relative to the erection of the new line. The local line at present has about 130 subscribers.

LEXINGTON, GA.—R. L. Callaway is contemplating an extension of the telephone line which he is just now completing to his home, on to Washington.

BURLINGTON, IA.—The Burlington system is preparing to put in a telephone service in its offices and yards here. A like system is in operation in Galesburg, and it is intended to equip every division point with them. Then all the division systems will be connected so that the entire

THE WEEK'S MESSAGES—Continued.

railroad system will be provided with telephone communication. The telephones are for the transaction of the business of the road, and will not be used in the dispatching of trains.

EASTON, ILL.—The Turner-Hutnut telephone line is being constructed through town. It is a rival of the Bell from Havana to Mason City.

HUTSONVILLE, ILL.—The Hutsonville Telephone Company has contracted for a connection with the Wabash Telephone Company. The Wabash company will begin at once to build a metallic circuit from Marshall to Hutsonville.

PITTSFIELD, ILL.—The Pike County Telephone Company will rebuild the line from Fish Hook to Griggsville, making it metallic. Ed D. Glandon is manager.

ANDREWS, IND.—Andrews is to have a new telephone exchange and a complete system of rural telephones, connecting up the farmers for miles around with the towns. Last March a franchise was granted F. E. Fults for establishing an exchange in that town, and it is under this grant that the new system will be installed at the opening of spring. Estimates for the completion of the work in town are being prepared, and orders for a switchboard and other material will be placed within the next month.

DECATUR, IND.—The Citizens' Telephone Company of Decatur will begin a campaign next spring which will result in connecting the entire northern part of Adams county with Decatur. The farmers of Union township have asked that the company run lines through the township.

TAHLEQUAH, I. T.—The Cherokee Telephone Company of Tahlequah, is rebuilding its line from Fort Gibson to Muskogee. The company will also rebuild from this end to Fort Gibson.

TOPEKA, KAN.—According to the plans of the Independent telephone companies, recently in session, this city will soon be the center of a network of Independent lines, one connecting Kansas City, one to Belleville and another to Wichita. These new ones are to be finished within six months.

TOPEKA, KAN.—G. P. Pierce is contemplating the construction of a telephone line direct to Willard and Dover. This will add about 100 telephones to the Rossville circuit.

BERNARDSTOWN, MASS.—The Nelson Telephone Company is meeting with encouraging success in its scheme for telephone extension in Gill and Bernardston. Already 35 subscribers have been secured in the two towns. In the spring the line will go to North Bernardston, and in the course of time will be put through to Leyden. There are now no telephones in the latter town.

KENSINGTON, MASS.—The Exeter Telephone Company is extending its line in town. New poles have been placed on the main road and new subscribers are to be added to its list.

NORTH LEVERETT, MASS.—George V. Bowen, who lately became sole proprietor of the North Leverett telephone system, has increased its business to about double, there being now 25 subscribers. The North Leverett company started with eight. In the spring the line will be extended to Locks pond and Wendell Center.

POCOMOKE CITY, MD.—The Pocomoke Telephone Company is extending its line to Crisfield, where it will be ready to operate in about sixty days. The rate to be charged for the rental of telephones will be $12 a year for both residences and business houses. There will be no tolls on any of its lines to subscribers.

PRINCESS ANNE, MD.—The Princess Anne and Pocomoke telephone companies expect to have their wires in Crisfield within the next sixty days, and an Independent exchange will be established in that town. The Princess Anne Telephone Company has purchased the Fairmount telephone line and a new equipment will soon be installed.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company will build a two-story brick building at a cost of $28,000.

KALKASKA, MICH.—C. W. Swaverly, of the Swaverly Telephone Company, of Kalkaska, has purchased a new switchboard and a carload of copper and iron wire for proposed extensions of his system. He now has nearly 1,000 telephones in service, and the business of the upper county lines which he operates is rapidly increasing.

HANNIBAL, MO.—Frank Buffum, of Louisiana, who is at the head of the company owning the Buffum telephone lines, and E. D. Glandon, of Pittsfield, Ill., have signed contracts with President C. H. Brown and Manager H. G. Conger, of the Bluff City Telephone Company, whereby the three systems will be connected. The companies are also to build a long distance line through to St. Louis this spring. Mr. Buffum has about 400 miles of lines, and Mr. Glandon is president of the Pike County Telephone Company, owning lines in Pike, Adams and Calhoun counties, in Illinois.

JOPLIN, MO.—The Home Telephone Company, of Joplin, has just installed a new multiple common battery switchboard, with Sterling protectors, Holtzer-Cabot power plant, toll board, wire chief and chief operator's desks. The company has just received 40,000 feet of lead covered cable, 7,000 feet of which is 200 pair. All wires in the city are copper. Toll lines, nearly all of which are metallic, have been completed between Joplin and Carthage, by way of Duenweg, Webb City and Carterville. The local system has been entirely rebuilt. It now has about 2,000 telephones connected and 1,000 orders. The new exchange will be in working order in about two months. Theodore Gary, of Macon, is president of the company.

CHARLOTTEVILLE, N. Y.—The Charlotteville Telephone Company is extending its line to North Harpersfield.

EAST AURORA, N. Y.—The Haines Telephone Company has completed the construction of its lines, and telephones are now being put in. About 90 subscribers have been secured, and the system will be in operation in about two weeks. Connection will be had with the Frontier system.

ILION, N. Y.—Within a very few weeks patrons of the Herkimer County Telephone Company will be able to speak with a large section of the State. Superintendent Fagan, of the local line, is arranging to accommodate 100 more telephones on the local system. He states that he has 75 applications for telephones which he is unable to supply, owing to the present switchboard being filled.

PULASKI, N. Y.—The Ontario Telephone Company, of Oswego, which recently secured the right of way for the construction of a line between this village and Oswego, is actively engaged in making the necessary arrangements preliminary to the commencement of the work. Anthony Dean, of Fulton, has secured the contract for the building of the line. W. S. Hall, of Boonville, a representative of the Black River Telephone Company, which a few weeks ago completed the work of setting up its poles to a point in this village, recently made a canvass for telephones among the local business houses. This company will, it is understood, work in conjunction with the Ontario Telephone Company.

WILLIAMSVILLE, N. Y.—Some time ago the village trustees granted the Frontier Telephone Company a franchise to put telephones in this village. The company has now commenced work.

AMESVILLE, OHIO.—The Sandrock Telephone Company is constructing a new line which will connect with the Amesville Telephone Company.

CASSTOWN, OHIO.—The Home Telephone Company expects to run a line east from Casstown on the Clark county pike.

HAMDEN JUNCTION, OHIO.—The Home Telephone Company will install an exchange system here.

WILLSHIRE, OHIO.—The Willshire Telephone Company is gradually extending its business, and intends this spring to extend its party lines in all directions. In August, 1901, when the company started in business, there were 27 telephones in actual use, and now there are close upon 70, with 15 party or county lines.

PONCA CITY, OKLA.—At the annual meeting of the Pioneer Telephone Company, at Guthrie, $3,000 was appropriated for new cable and other improvements at Ponca City, also for a new line south by way of Bliss and Red Rock to Perry.

BALDMOUNT, PA.—The Newton, Ransom and Lake Winola Telephone Company will hold a meeting at its office here on April 8 for the purpose of increasing the capital stock from $3,000 to $20,000. It is proposed to extend the lines to Tunkhannock, Factoryville, Nicholson, Waverly and other points.

MESHOPPEN, PA.—The Tunkhannock and Wyoming Valley Telephone Company is canvassing Meshoppen with a view to installing a local and long-distance service. The management of the local business will be in the hands of George Gaylord.

ERIN, TENN.—The Houston County Telephone Company will extend a line to Ellis Mills.

PARIS, TEX.—B. S. Young, of Lima, Ohio, president of the Citizens' Telephone Company, says that a toll line will be extended from Sherman to Texarkana and intermediate points, and that the toll service will give connection with Sherman, Denison, Dallas, Fort Worth, Waco, Austin, Houston, Corsicana, Waxahachie, Ennis, San Antonio, Galveston, Beaumont, Orange, Port Arthur, Nacogdoches, Temple, Taylor and all populous centers in Texas. He said that Paris would be in touch with St. Louis and Kansas City within the year, and that the lines would be extended into the Territory.

WAUSAUKEE, WIS.—Manager A. W. Larson, of the Wausaukee Telephone Company, says the line is to be extended to Pembine.

PARKERSBURG, W. VA.—In a few days Parkersburg and all towns and cities now connected by the West Virginia Western telephone system will be connected also with a number of important points south of here in Ohio. A cable is being laid across the Ohio River, connecting the local system with the Home Telephone Company's system in Ohio.

MISCELLANEOUS

ANDERSON, IND.—The City Council has passed an ordinance requiring the Anderson Telephone Company to furnish free telephones to the city officials, the schools and the councilmen.

FRANKLIN, IND.—Frank F. Smith and Victor Smith, local capitalists, have taken an interest in the Franklin Telephone Company, heretofore controlled by F. R. Strickler. Victor Smith becomes the president and Frank F. Smith the vice-president; F. R. Strickler, secretary-treasurer. The addi-

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tional capital will provide means for extension. The company owns the city system and that in Johnson county, with lines extending into other counties.

MILFORD, IND.—The Royal Telephone Company, of Milford, has just completed a toll line connecting the local exchange with Syracuse, Ind. Communication is free each way for subscribers, a toll of 10 cents being charged to non-subscribers. L. M. Neher is manager.

NORTON, MASS.—The Farmers' Mutual Telephone Company, recently incorporated with a capital stock of $10,000, has its initial plant in operation with ten stations, using the Clark automatic telephone apparatus. New lines will soon be built. The officers of the company are: A. M. Round, M. D., president; Alfred W. Wild, treasurer; William E. Payson, clerk, and F. A. Clapp, superintendent.

BANCROFT, MICH.—The new telephone exchange put in at Bancroft by the Union Telephone Company has gone into commission, with 92 subscribers. This includes the rural residents in all directions.

NORTH LOUP, NEB.—The Ord Independent Telephone Company has established an exchange here with about 50 customers. The company proposes to connect a large portion of the farming community with the exchange here, and will ultimately reach out to Arcadia, St. Paul and Greeley Center.

GRANT, N. Y.—The Farmers' Telephone Company's line to Grant is now completed, and over 20 farmers and business men are subscribers. The following are the officers chosen: President, Frank Woodin; director, George Daniels; secretary, L. C. Way; treasurer, F. J. Sands.

PENN YAN, N. Y.—A connection has been made between the lines of the Inter-Ocean Telephone Company, of this place, and the lines operated by the Pulteney and Branchport Company. Papers of incorporation of the latter line will be filed in a few days, the capital stock being placed at $1,000.

SENECA, N. Y.—The Home Telephone Company has changed its name to the Seneca County Telephone Company.

AKRON, OHIO.—The Farmers' Telephone Company, with headquarters at Marshallville, has completed its toll line to Wadsworth and made the necessary connection with the People's Telephone Company.

FRANKLIN FORKS, PA.—The People's Mutual Telephone Company has extended its line from Franklin Forks to Lawsville.

EL PASO, TEXAS.—The time for the completion of the plant of the Southern Independent Telephone Company has been extended six months. The company has spent $35,000 on the new system.

PERSONAL

OSBORNE, KAN.—Dr. E. E. Isenberg, of Natoma, was looking after the interests of the Natoma-Osborne Telephone Company in this city recently.

CUBA, N. Y.—George H. Swift has resigned as manager of the Cuba Telephone Company, and H. F. Wilcox has been appointed to that position.

ELMIRA, N. Y.—H. A. Benedict, of Elmira, has been appointed manager of the York State Telephone Company.

LONDON, OHIO.—Fred W. Pierce, manager of the Madison Clark Telephone Company, has resigned his position to go into other business. Since Mr. Pierce's connection with the company its business has grown wonderfully, and it now has over 1,000 subscribers and connections, with over 2,500 in the county. W. J. Meech, of Louisville, is the new manager.

TEMPLE, TEXAS.—W. F. McLaughlin, who has been local manager of the Independent Telephone Company at Temple for a number of months, has resigned his position to accept service with the Commercial Telephone Company, with headquarters at Austin. The change is in the nature of a promotion, and Mr. McLaughlin has gone to San Antonio to report for duty.

TRADE NOTES

THE VOUGHT-BERGER COMPANY, of La Crosse, Wis., makers of telephones and switchboards, have been awarded the contract for furnishing 1,000 telephones for the new La Crosse Telephone Exchange at La Crosse, Wis.

THE W. G. NAGEL ELECTRIC COMPANY, of Toledo, Ohio, reports a steady increase in its sale of "ready" pay-out reels. Its tandem reels for toll line or drop work are meeting with favor wherever used. They will fit any three-foot wagon bed, making it possible to run a number of wires in one-half the time ordinarily required, thus saving not only time but labor. Bulletin No. 5, describing these reels, will be sent upon application.

THE CALCULAGRAPH COMPANY of 9, 11 and 13 Maiden Lane, New York, owns United States patents Nos. 424,291, 424,292, 449,192, 583,320, 679,408, 697,426 and 697,427. These patents cover all forms of apparatus which will calculate and record elapsed time or the value of elapsed time. Any apparatus or instrument of this character manufactured by others or offered for sale in the United States is an infringement of these patents, the Calculagraph Company declares, and will not be permitted. The company also owns trade-mark patent No. 21,747 covering the use of the word "Calculagraph."

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

WANTED—300 drops or less, second hand American Express Metallic Circuit Drop. Address DROP, care AMERICAN TELEPHONE JOURNAL, 1263 Monadnock Block, Chicago.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

WIRE chief, formerly in charge Bell exchange, 3,000 lines, New York, wants position as manager of 500 to 1,000 subscriber exchange. References. Address E. F. L., care THE AMERICAN TELEPHONE JOURNAL, N. Y.

POSITION as manager and engineer in exchange of 2,000 lines or less. Formerly wire chief in Bell exchange, N. Y., 3,600 lines. Address H. J. S., care AMERICAN TELEPHONE JOURNAL, N. Y.

POSITION by a thoroughly competent young man as manager of a small telephone exchange. Address Box 101, Greenfield, Ohio.

AN ASSISTANT MANAGER from a large New York City (Bell) Exchange and competent Traffic Manager desires position away from New York City as manager or superintendent. Address "EX-BELL," care AMERICAN TELEPHONE JOURNAL, New York.

WANTED, position as manager or assistant of an exchange of 200 to 500 subscribers. Several years' experience; can give good references. Address J. E. THURSTON, North Vernon, Indiana.

POSITION by an all-round telephone man, as manager of small exchange or as inspector or troubleman. At present with Bell company. Address W. M. G., care AMERICAN TELEPHONE JOURNAL.

WANTED—A telephone man, who can be bookkeeper and collector as well as inspector or manager, for live Western town in the mountains. Only good men with references need apply. Address DEADWOOD, care of AMERICAN TELEPHONE JOURNAL, New York.

The American Telephone Journal

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THE STORAGE BATTERY AND TELEPHONE WORK*

By F. C. Barr.

THE storage battery is the key to the power system of the telephonic exchange. It furnishes the talking current, energy for the lamp signals and the ringing machines, and, in cases of emergency, may illuminate the board. If the storage battery is out, it is as if the heart of the exchange had stopped beating, and the nerves or telephone lines, are for the time being so much useless wire. For this reason it is the practice to install, whenever possible, a number of reserve power circuits to run the charging motor-generators, so the chances that all current will be cut off at the same time is very slight.

In applying central energy to the subscriber's lines, a number of methods were tried. First, the battery was placed in series with the lines of the two talking subscribers, but this system was not successful, since the speech bearing current was not transmitted evenly. Next the battery was bridged across the line and on each side of the battery between it and the line, impedance coils were placed which prevented the battery from short circuiting the talking impulse. This is known as the Stone system.

A still further improvement is the Hayes system, in which the retardation coil is replaced by the two windings of a repeating coil. One side of the battery is connected to the middle point of the two windings, the other two ends of the winding being connected to the line wires. The repeating coil is better than the simple retardation coil, since it utilizes whatever leak of talking current there is through the battery to supply an inductive reproduction of the talking impulse.

The magnitude of the talking current may be theoretically as small as forty-four one billionths of an ampere. An experiment made by Houston & Kennelly, and recorded by them in "The Electric Telephone," shows that with a Bell instrument and with an alternating current of 640 alternations per second—that is, a frequency about equal to the pitch of the "E" in the second octave above middle "C"—a current of forty-four one billionths will produce a distinctly audible tone. In practical work, however, a much greater current is required owing to the necessity of operating relays, signals, etc. A 24 hour average shows that we use for signalling and talking current, about .42 amperes per 100 subscribers. This does not include the battery current which runs the ringing machine.

Storage batteries have been subdivided by different authors into a number of different classes. Treadwell gives four varieties. The lead-sulphuric acid genus, including most of the batteries in actual use to-day; the lead-copper genus, consisting of a sheet of metal coated with lead oxide for the positive electrode, a copper plate for the negative electrode, and an electrolyte of copper sulphate solution; the lead-zinc genus, in which the copper and copper sulphate are replaced by zinc and zinc sulphate; and the alkaline-zincate genus, in which copper is used as the positive and iron as the negative electrode, and sodium or potassium zincate, as the electrolyte. Of these types only the lead-sulphuric acid genus, need be given any consideration.

The positive, and the negative pole of the battery, must first be defined, since the reversing of the discharge conditions during charge have led to a confusion of ideas on this subject. The universal practice in this country, is to assume that the storage battery during discharge is analagous to the primary battery, and, therefore, the current flows from the positive to the negative pole outside of the battery; inside of the battery, it flows in the opposite direction.

The theory of the storage battery is still a matter of debate. With a battery having lead peroxide as the positive electrode, and spongy lead as the negative electrode, the following general changes may be said to take place. During charge, lead sulphate is formed at both electrodes, the sulphur being taken from the acid of the electrolyte, leaving a molecule of water in place of a molecule of acid, and reducing the specific gravity. The positive peroxide is supposed to first change to monoxide and then to sulphate. During charge the action is reversed, the sulphate being changed to peroxide on the positive and metallic lead on the negative plate. The following is taken from volume 33, of the London *Electrician*: "Theoretically the amount of energy which one pound of lead would generate if wholly converted into lead sulphate, could be produced by ¼ of a pound of zinc or iron, or about ½ of a pound of copper. Practically the very property of lead which, at present, constitutes its superiority to other metals, that is, the insolubility of its sulphate, at the same time limits its efficiency by reducing the energy obtainable per pound of metal to a small fraction of the amount theoretically possible. In the first place the active material requires a grid or support of inactive material, which, even in the best form, will weigh nearly as much as itself and in the Plante type, may be many times its own weight. Secondly, under the best conditions not more than one-half of the active material is really acted upon because the sulphate formed on its surface effectually screens the inner portions. The combined effect of these two causes is, that not more than five per cent. to fifteen per cent. of the weight of the electrode is usefully employed." Theoretically we should get 100 A. H. per pound of active material; in actual practice we get about 16 A. H. An important feature of the storage battery, and one which renders it especially applicable to telephone work is its low internal resistance, which may be one hundredth of an ohm or less, depending on the size of the plates, their number, etc. The internal resistance is not constant, being less when a large current is flowing, than when on open circuit, and greater when a small current is flowing than when on open circuit. The internal resistance on open circuit increases with the number of discharges, and is smallest when the cell is about half discharged, after which it may increase to perhaps 15 times its minimum value. It also depends on the concentration of the electrolyte being least for a value of 1.250. This value, however, is not that of the highest voltage, since the voltage increases with the degree of concentration of the electrolyte. Other things being equal, a voltage which would be 2.1 at a concentration of 1.100 would be about 2.26 at a concentration of 1.300. Gladstone and Tribe noticed that when the acid is very weak, the chemical action is changed, the formation on the positive plate being a mixture of yellow and puce colored lead oxides, while on the other parts a white and easily detachable substance was deposited.

The importance of a low battery resistance is shown by the action of the operators' sets. If these sets are bridged on to bus bars having an appreciable resistance, the variations in the talking current due to any one set, will make a variation in the bus bar potential difference and all the telephone sets will cross talk.

Kempster B. Miller in his book, "American Telephone Practice," cites the following example: "The battery was a single 200 A. H. cell of the American type, and there were 10 transmitters, each having a resistance of about 10 ohms, the resistance of the primary coils being in each case .38 of an ohm. The bus bars were each 7 feet long and each composed of two number 6 B. & S. gauge copper wires in parallel. Serious cross talk existed, and was only removed when the bus bars were made of 000 trolley wire, and shortened down to 18 inches."

The charging of a storage battery requires careful attention. A normal charging current is specified by the manufacturers for each type of cell and this should be strictly adhered to; about

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*Abstract of a paper read Jan. 29 before Colorado Branch, American Institute of Electrical Engineers.

7 to 8 amperes per square foot of positive plate area is the usual rate. If the charging current is too small, the chemical action is changed.

Gladstone and Tribe noticed this and in their book on the storage battery, wrote the following: "If we take two plates of lead in dilute sulphuric acid, and pass a current from only one Grove cell, a film of white sulphate, instead of peroxide, makes its appearance on the positive plate, and the action practically ceases. If, however, the current is increased in strength, the sulphate disappears and peroxide is found in its place."

The lower limit of the charging rate is, however, very low. Treadwell places it at one-thirtieth the normal charging rate.

On the other hand, too large a charging current will evolve an unnecessary amount of heat and gas, will cause "buckling" or unequal expansion of the plates, possibly a short circuiting of the plates, or perhaps a grounding of the outside negative plates on the lead lined tank. This case has a special significance in telephone work, since the positive pole of the battery is always grounded, and if the negative side of the battery touch the lead lining of the tank, there will be a complete circuit established, and the lining will be eaten away by electrolysis.

Some claim especial advantages in charging at a constant voltage, say 2.3 volts per cell. This would mean, of course, more rapid charging in the initial state. It has been found that when a battery has been charged in this way, about 50 per cent. of the total energy is stored during the first hour, 75 per cent. at the end of the second hour, and 83 per cent. at the end of the third hour. Another method of charging which has been used, is the three-voltage method, in which a low, medium and high voltage is employed, as the battery becomes more and more thoroughly charged. The experiment has been tried at a central station in Zurich, Switzerland, of charging with a rectified alternating current, and it has been claimed that this method gives unusually satisfactory results, the rectified current having the property accelerating the electrolytic actions in the battery.

The point at which to stop charging is shown in various ways, the most reliable of which is the specific gravity reading. There is a steady rise in specific gravity until the battery is about charged, when the gravity increases more and more slowly, and finally a point is reached at which the specific gravity is stationary. The battery is then fully charged.

Another and somewhat less accurate method of determining the charge is by the voltage, which will rise from two volts up to 2.5 or 2.6 volts with the charging current passing through the battery. A third method of telling, is by the color of the positive plate, which changes from a light cocoa color to a dark chocolate. Also, the cell will begin to gas as the charge is nearing completion. In actual practice all of these signs may be noted, but the one which is the most reliable is, the specific gravity which shows no further rise by continuing the charge.

In discharging the battery, on the other hand, the voltage is the best indication, and should not be allowed to drop below 1.8 volts per cell, a point of discharge which leaves about 30 per cent. of the cells capacity unused.

Mr. Griscom gives the following reasons why the discharge should be stopped at this point: First, regulation is troublesome; second, the efficiency is low; third, dangerous molecular changes take place, as indicated by the changes in the internal resistance, and in the E. M. F. as well as by "buckling;" fourth, uneven plates discharge into one another after the circuit is interrupted; fifth, the life of the battery is shortened.

Experiments made by Mr. Griscom showed that when a battery was completely discharged daily, its life did not exceed 500 charges, but when it was only worked to within 2-3 of its capacity, it gave entire satisfaction. This means, that in designing a battery for any given service, 50 per cent. of the maximum battery load should be added to the battery capacity. When a battery is worked in this way its efficiency is much greater.

Usually there is one more negative plate than positive, and this has sometimes been a source of trouble since the end positive plates discharge more rapidly than the intermediate ones and thus produce buckling. In some batteries this is remedied by punching the active material out of the alternate meshes of the grid in the end negatives.

The life of a storage battery under varying conditions of use is a point which has not been determined with any degree of accuracy. Telephonic work is the ideal service for the battery, and yet it has been claimed that the battery does not last as well as would be expected. Five years has been given as the average life of the battery in telephone service, but I think this is an under estimate, since I am personally acquainted with one battery which has been in telephone use for five years, and, while not as good as new, still, from all indications, it will run for five years more without giving serious trouble. The negative plates have a life of from 1.5 to 2 times as long as the positive. On this subject some interesting articles have recently appeared in the *Electrical World and Engineer.*

Of course the life of a battery depends greatly on the care it receives. The electrolyte should be tested occasionally for impurities, such as iron, copper, chlorine, nitrates, etc., and if any considerable amount be found, the electrolyte should be renewed.

The battery should also be carefully watched for scale on the plates, which is apt to form when the discharge is carried to too low a point.

To keep records of the action of storage batteries, telephone companies have adopted a system of daily and weekly reports. Blanks are supplied to the battery attendants upon which they record the specific gravity and voltage of some one cell selected as a test cell, both before and after giving the battery its daily charge. In each case the voltage is taken when the charging current is not flowing, that is, just before the beginning of charge and just after the end of charge. Additional readings are taken once a week of the specific gravity and voltage of each cell of the battery, at the end of charge, and while the charging current is still flowing through the battery. The voltage of the cell when the charging current is flowing is several tenths of a volt higher than when the cell is on discharge. The difference in voltage is more than could be accounted for by the simple ohmic drops, and I don't know that any explanation of this discrepancy has ever been given. The Sp. Gr. of the electrolyte when the cell is charged is kept at 1.200, and when the gravity goes as high as 1.205 on charge, due to evaporation, distilled water is added to the cell. The water alone evaporates, the same acid lasting for years.

It should be mentioned that in some places the experiment has been tried of omitting battery and running the exchange directly off the generator. Special arrangements must then be made to keep the lines from being noisy, due to the slight fluctuations in the current introduced by the act of commutation. These exchanges have been very unsatisfactory in practice, however, and there is little or no indication of their superceding or even rivaling the common battery telephone exchange.

CONVENTION PROCEEDINGS OF THE WISCONSIN ASSOCIATION

MILWAUKEE, in the neighborhood of the Hotel Pfister was the scene, last week, of a good deal of bustle and enthusiasm. Every available inch of space in the hotel corridors, parlors and rooms was occupied with telephone delegates to the annual convention of the Independent Telephone Association of Wisconsin and representatives of the various manufacturers and supply houses. The convention lasted two days.

The meeting was called to order February 11 in the hotel convention hall at 12 o'clock noon by President Richard Valentine. The president read his annual address, in which he spoke of the continued rapid growth of the Independent telephone business in the state. Many companies had increased their capital stock, and during the year 41 new telephone companies, with a total capital of over $1,000,000, were organized. The present number of Independent companies in Wisconsin was 200, having 1,000 toll stations, 200 exchanges and 30,000 subscribers. In most of the cities, still remaining under monopoly rule, exchanges were being built or contemplated. Great progress was also being made in developing the rural telephone business. Long distance copper trunk lines were needed more than ever to connect the many local systems, and there was the strongest assurance that these would be built the coming season.

The president also spoke in regard to the pamphlet issued by the Bell Company, entitled "Competition *vs.* Monopoly," which the Bell Company intended should discourage the investment of capital in the Independent telephone business, but the many fallacies of the book were pointed out and this publication would have little or no effect in heading off additional Independent enterprises.

On motion that a committee on resolutions be appointed, the chair selected Messrs. Crowley, Teasdale and Goodrich.

A committee of five on legislation was appointed, consisting of Messrs. Harper, Hutchinson, Ferdinand, Larson, Valentine and Cavanaugh.

Motion was made and adopted that a committee of five be appointed to consider and revise the schedule of toll rates, and the chair appointed Messrs. Hutchinson, M. D. Larson, Harper and Teasdale.

A committee of five was appointed to draft suitable memorial resolutions upon the death of Mr. Lohmiller and Mr. Colonious, members of the association. The committee appointed was Messrs. Keelyn, Bell and Kepler. An adjournment was then taken until 2:30 P. M.

When the meeting reconvened at 2:30 P. M., Mr. Keelyn presented the report of the memorial committee upon the death of Mr. Lohmiller, of the LaCrosse Telephone Company, a member of the executive committee, and Mr. Colonious of the Central Wisconsin Telephone Company, of Portage, which was adopted.

A. L. Hutchinson, of Weyauwega, of the Interurban Telephone Company, then read a paper on "Uniformity of Toll Rates," which is abstracted elsewhere in this issue.

C. W. Farr, of the Farr Telephone & Construction Supply Company, made an address on the subject of "Generators," discussing at length the many requirements of a proper telephone generator.

J. E. Keelyn, of the Western Telephone Mfg. Company, Chicago, gave a talk on "New and Old Telephone Problems." He discussed briefly the early history of the telephone; that the Bell Company was the acme of monopoly while its patent lasted, and talked of the rapid progress being made by the Independents.

On motion a committee of five to devise plans for interesting the citizens of Milwaukee and securing an Independent telephone exchange in that city, was appointed as follows: Messrs. Cavanaugh, Lloyd, Ferdinand, Baer and Keelyn.

J. C. Harper, Madison, of the Dane County Telephone Company, talked on the subject of "Prospective Telephone Legislation," in which he referred to bills so far introduced in the legislature and discussed the effect they would have on the Independent telephone business. He advised against the bill compelling interconnection between different telephone companies, as this would be to the disadvantage of the Independents.

President Valentine also discussed such a bill and gave many reasons against the passage of such a measure.

The meeting was then adjourned to 10 A. M. the next day.

SECOND DAY'S SESSION.

The meeting reconvened at 10 A. M. February 12, and W. A. Taylor, of the Standard Telephone & Electric Company, Madison, read a paper on the "Comparative Merits of the Magneto and Central Energy Systems," which is printed on another page.

Mr. A. L. Hutchinson presented the report of the committee on toll rates and the report was discussed at length by Messrs. Valentine, M. D. Larson, Thielman, A. W. Larson, Crowley, Hutchinson, Bell, Lloyd, Hackney, Nate, Fehland, Croll, Slater, Bryant, Middlesworth and Mansfield, which brought out a great variety of opinions on this subject, and after some amendment the report was adopted.

A new resolution was also adopted on this subject, that to encourage the investment of capital to build long distance copper toll lines, the companies of the association would be willing to handle such long distance business for a commission not to exceed 15 per cent. of the outgoing tolls. Mr. Crowley suggested that all the companies in the Independent Association take a proportionate share in the long distance company, to the amount of 10 per cent. of their own investment, and in this way the long distance lines could soon be built.

There was then a further discussion of the toll rates and lines, after which the meeting was adjourned until 2:15 P. M.

When the convention again assembled, Mr. Harper presented the report of the committee on legislation to the effect that the legislative bill giving telephone companies the right to the indiscriminate trimming of trees be opposed, as this would arouse public sentiment, and that the bill to regulate telephone and toll rates be also opposed, unless the same could be modified.

The committee further recommended that a bill be introduced in the legislature to prohibit discrimination in telephone charges in cities belonging to the same class, and for that purpose, the citizens of the state be divided into a certain number of classes. Such report was adopted and on motion the legislative committee was made permanent.

On motion a committee of three consisting of Messrs. Bell, Hackney and Gosselin was appointed to nominate officers.

Mr. Crowley presented the report of the committee on resolutions, in which the press of Milwaukee was thanked for its efforts to inform the citizens of Milwaukee of the growth and importance of the Independent telephone business of Wisconsin. And further, that the association request its members not to patronize supply companies which sell to other Independent companies, attempting to undermine Independent companies now established. Further, that only such companies that connect their toll lines and exchanges with other legitimate Independent companies, where oportunity offered shall be eligible to membership in the association. And further, that thanks be extended to the officers and committees of the association for their faithful service the past year, and that in future meetings, all supply companies close their exhibits during the hours that the convention is in session. Such report was discussed and after a slight amendment was adopted.

Attention was also called to the fact that where any Independent company was buying its supplies from the Western Electric Company, it was patronizing the Bell Company, and it was the sense of the meeting that no Independent company should continue assisting the Bell Company in this way.

The secretary then read the following list of companies that had made application for membership, and on motion each application was accepted: The Sheboygan Telephone Company, Sheboygan; The Northwestern Telephone & Electric Company, Milwaukee; Mt. Horeb Independent Telephone Company, Mt. Horeb; Valley Telephone & Telegraph Company, Green Bay; McFarland Telephone Company, McFarland; Citizens' Telephone & Electric Company, Kenosha; Menominee Range Telephone Company, Iron Range, Mich.; Maquon Telephone Company, Thiensville; Rock River Valley Telephone Company, Lake Mills; Wausaukee Telephone Company, Wausaukee; Mazomanie Telephone Company, Mazomanie; American Electric Fuse Company, Chicago; Automatic Electric Company, Chicago; Illinois Electric Specialty Company, Chicago; Swedish-American Telephone Company, Chicago; Holtzer-Cabot Electric Company, Chicago; Green Telephone & Electric Mfg. Company, Milwaukee.

The secretary then read his annual report for the past year showing the financial condition of the association. On motion an assessment of 1 cent per telephone and 2 cents per mile of toll line was levied upon the members.

Mr. Hackney then presented the report of the committee on nominations, as follows: For president, Richard Valentine, Janesville; vice-president, H. G. Slater, Waupaca; secretary-treasurer, H. C. Winter, Madison. Members of the executive committee: C. W. Twining, Monroe; F. H. Sweet, Fond du Lac; J. C. Harper, Madison; W. F. Goodrich, La Crosse; J. Thielman, Merrill; John M. Baer, Appleton; M. F. Smith, Hixton; J. C. Crowley, Jr., W. Superior, and William J. Bell, Baraboo, committeeman at large. On report this motion was unanimously adopted.

Mr. Valentine thanked the association for the honor again bestowed upon him, and promised to continue his warfare upon the Bell Company or anything that looked like a Bell company. He predicted that this present year would see the construction of the much needed copper toll lines, and that all should co-operate in this work.

On motion it was decided to hold the June meeting at Madison, and the next annual meeting again in the city of Milwaukee.

On motion that a committee of two be appointed to devise a design for advertising Independent telephone stations, the chair appointed Mr. Birch and Mr. Ritter, and requested them to report at the June meeting. The convention then adjourned.

OPERATING COMPANIES REPRESENTED.

The following is a list of Wisconsin telephone companies represented at the convention: Badger State Telephone and Telegraph Company, Neillsville, E. E. Heath; Badger State Long Distance Telephone Company, Janesville, C. C. Russell and John K. Fish, Milwaukee, and R. Valentine, Janesville; Beloit Telephone Company, Beloit, J. E. Carr; Brodhead Telephone Company, Brodhead, John C. Murdoch; Central Wisconsin

Telephone Company, Hixton, M. F. Smith; Central Wisconsin Telephone Company, Portage, W. J. Bell; Citizens' Telephone Company, Racine, Wm. Van Middlesworth and C. M. Smith; Citizens Telephone Company, Kenosha, Jas. Cavanaugh, J. A. Pitts and George A. Yule; Clinton Telephone Company, Clinton, A. V. Peters and C. E. Gosselin; Dane County Telephone Company, Madison, J. C. Harper and H. C. Winter; Dane County Rural Telephone Company, Madison, J. C. Harper; Eastern Wisconsin Telephone Company, Elkhart Lake, A. A. Paulson, G. A. Kramer and H. B. Greve; Edgerton Telephone Company, Edgerton, F. W. McKinney and W. H. Shelley; Eureka Telephone Company, Neosha, J. M. McCallow; Elk Mound Telephone Company, Elk Mound, J. E. McCoy and Edw. Jacobs; Fox River Valley Telephone Company, Appleton, John M. Baer; Friendship Telephone Company, Friendship, Wm. J. Bell; Inter-State Telephone Company, Winona, Minn., Otto Troost; Interurban Telephone Company, Sun Prairie, Chas. Shernecker, A. L. Hutchinson and H. E. Kepler; Juenau Electric Company, Mauston, W. H. Cash; Kirchayn and Cederburg Telephone Company, Kirchayn, Wm. Fisher and W. P. Jochem; La Crosse Telephone Company, La Crosse, W. F. Goodrich; Little Wolf River Telephone Company, Fond du Lac, F. H. Sweet; Mauston Electric Light and Power Company, Mauston, W. H. Cash; Mazomanie Telephone Company, Mazomanie, D. L. Bestor; McFarland Telephone Company, McFarland, M. D. Larson; Menominee Ridge Telephone Company, Iron Range, Mich., E. A. Croll; Mequon Telephone Company, Thiensville, J. V. Carlys; Merrill Telephone Company, Merrill, J. Thielman; Merrill and Wausau Toll Line Company, Merrill, H. R. Fehland; Mineral Point Telephone Company, Mineral Point, R. J. Penhalligan; Monroe Telephone Company, Monroe, W. P. Bragg, L. A. Hodges and P. J. Weirich; Monroe County Telephone Company, Sparta, H. Teasdale; Mount Horeb Independent Telephone Company, Mount Horeb, F. E. Bell; Northwestern Telephone and Electric Company, Milwaukee, A. B. Ferdinand and W. H. Burke; Oakfield Telephone Company, Oakfield, W. E. Bristol and A. J. Zielke; Pardeeville Telephone Company, Pardeeville, F. H. Smith; Peoples' Telephone Company, Rio, J. L. Farrington; Peoples' Telephone Company, West Superior, J. C. Crowley; Perkins & Son Telephone Company, Medford, A. J. Perkins; Plattville, Rewey and Ellenboro Telephone Company, Platteville, P. H. Jeardeau; Plymouth Telephone Company, Plymouth, C. Pfeifer and L. H. Schram; Portage Telephone Company, Portage, Wm. Bell; Prairie River Telephone Company, Merrill, H. R. Fehland; Richfield Telephone Company, Richfield, Geo. Klipel and Geo. Meyer; Rock County Telephone Company, Janesville, Richard Valentine; Rock County Farmers' Telephone Company, Janesville, Richard Valentine; Rock River Valley Telephone Company, Lake Mills, J. R. Mansfield; Sheboygan County Telephone Company, Sheboygan, W. H. Burke and A. B. Ferdinand; State Long Distance Telephone Company, Delavan, H. C. Hackney; Telephone Toll Line Company, Grand Rapids, A. W. Bryant; Theresa Union Telephone Company, Theresa, William Frings and Nat Haessly; Troy and Honey Creek Telephone Company, Prairie du Sac, J. C. Kuoni and John Bonham; Union Telephone Company, Richland Center, E. M. Pease; United Telephone Company, Monroe, P. J. Weirich; Valley Telephone and Telegraph Company, Green Bay, C. B. Lloyd, Phil Sheridan and D. M. Hagerty; Walworth Telephone Company, Walworth, H. C. Hackney; Waupaca Citizens' Telephone Company, Waupaca, H. G. Slater; Wausaukee Telephone Company, Wausaukee, A. W. Larson; Wood County Telephone Company, Grand Rapids, A. W. Bryant.

THE RELATIVE MERITS OF CENTRAL ENERGY AND MAGNETO TELEPHONE SYSTEMS IN SMALL EXCHANGES*

By W. A. Taylor.

THERE is no doubt that with a large exchange system, the cheapest and most advantageous service may be given with central energy. It is only where the system is small that any doubt arises as to which is the best.

We will first consider the exchange which is just starting into business. The first problem is to choose between the two systems. Cost will probably be the first consideration. In an exchange where the instruments and switchboard for a magneto system cost twenty-five hundred dollars, the central energy system would cost for, the same size, approximately the same where primary batteries are used and fifteen per cent. more with storage batteries. The difference lies in the added complexity of the central energy plant in the switchboard. The average help in an exchange of this size is not competent to hunt out the trouble on such a switchboard. In fact, the simplest form of board is usually a considerable problem for such help to take care of. So it is necessary to employ a much better man who will demand a higher salary. The battery question has been argued in favor of central energy. To be sure, the matter of inspection is a considerable item in a local battery system, but in an exchange of two hundred subscribers, one man can take care of the system, so the matter resolves itself wholly to the cost of batteries. For central energy purposes, some form of battery must be used, which possesses a very low internal resistance; such battery is either some form of caustic soda battery or storage cells. If of the former type, there would be required not less than twenty-five cells each of which costs as much as ten dry cells and they would have to be renewed as often or oftener. If storage cells are used they must be charged. The charging requires either a charging machine or the reduction of the voltage through a resistance. The charging machine, adds to the expense of the exchange and charging through resistance is notoriously wasteful. If any other type of battery is used the internal resistance is so great that excessive cross talk is thrown into the system.

The magneto system, taken as a whole, is of course more complicated than the central energy, but as the complication is divided through a large number of telephones, any trouble is not apt to affect the service of the whole exchange. Any battery trouble on a central energy system is liable to throw out the whole system. In order to conserve the primary battery of a central energy system, it is usual to insert a considerable resistance in the circuits. This makes the amount of current for each telephone very small, in fact too small to permit the transmitters to work at their maximum efficiency. If we add to this, the resistance of the longer lines, we will find that a certain number of the telephones are giving poor service.

The well designed central energy transmitter will work at its maximum efficiency with a current of .15 ampere, and there will not be a very marked decrease in the transmission where the current is reduced to one-half that amount. This gives a permissible line circuit resistance of 24 volts, of 160 ohms or a line of number 12 iron about two and one-half miles long. Where lines are longer or of higher resistance, there is an immediate falling off of the amount of current and consequently of the transmission. So where long country lines are used, the central energy system must give way to the magneto.

Taking a 200 line exchange, there would be 400 cells dry battery costing in the neighborhood of $60. In the central energy exchange there would be, in order to have 20 volts, 33 cells of primary battery of a type fit for central energy work. These cells would be of 250 ampere hours capacity and would cost not less than $65. The dry cells would easily last one year on an average. The central energy cells would last in this exchange where there were 500 calls a day, each averaging three minutes, not longer than four months unless the current supplied to the lines was so small that the transmission suffered greatly. There would then be something like $130 difference in favor of the dry cells, on a local battery system. With storage cells the expense of maintenance would depend upon the rates charged for current. It would require one man to take care of the exchange in either case, though he would be kept busier in the exchange using the local batteries.

The line work for a central energy system, must be of the best, and so built that there will be a minimum number of crosses to exhaust the batteries.

The central energy system is a little more convenient where the exchange is very busy, as the operator can take care of a larger number of calls. It is not the usual experience in an exchange of 200, that the calls cannot be easily taken care of where a magneto system is used.

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*Paper read at Wisconsin Association Convention, Milwaukee, Feb. 11 and 12, 1903.

Where it becomes necessary in a magneto system to have more than one man constantly employed in inspection work, a central energy system then is the most economical, for one man can cover twice the ground in such a system than in a magneto exchange.

From the standpoint of efficient transmission, there is no difference between the central energy and magneto system, provided the lines are not too long. A central energy system can talk with local battery systems without any difficulty and very efficiently, making the talking over long distances very feasible.

How large must an exchange be before it will pay to change from a magneto to a central system? That will of course depend upon the condition of the telephone apparatus. Sold as second hand, telephones will hardly bring enough to make it worth the while to handle them. It is always possible to rewire a telephone and put in the necessary apparatus, and if the instrument is in good condition it is a very good method.

As to the switchboard, it should not be discarded until it has lost its usefulness, either because worn out or because it is so slow that it cannot be used successfully. According to general experience, it has been found that if the new board is to be bought and the exchange is to have as many as 500 subscribers in the near future, it will be advantageous to install a central energy system. It is of course, out of the question to put in a central energy exchange of that size unless storage batteries are used. Where these batteries are used it is better to have a source of energy that will never fail. In fact it is much better to have two sources of energy, so that one may always be available.

THE NECESSITY OF UNIFORMITY*

By A. L. Hutchinson.

AN element of success in any undertaking is harmony. The success of the Independent telephone movement depends in particular upon this element.

There is no business on earth with which to compare telephony. Independent companies are formed and exchanges built up by local communities; but the thousand and one companies so formed, soon become linked together by ties which bind the companies together more closely than the marriage rites bind husband and wife. When discord disturbs the relations of the latter relief may sometimes be found in the courts and more congenial alliances are sometimes formed. But with telephone companies they "All are parts of one stupendous whole," and when they disagree, the only relief lies in correcting the causes of the troubles.

The world is large, the United States is large, and Wisconsin is large. The telephone industry is but in its infancy, and it would seem that there should be no rivalry and no attempted competition between Independent companies. But many instances do occur where rival Independent telephone companies seek to control the same territory. Let such rivalry be stopped. If the question of priority of occupation of a particular territory can not be settled by mutual agreement, submit the disputed question to the Executive Committee of the States Association and abide by its decision. That work is one of the specific duties imposed upon the Executive Committee of this Association and one of the objects of this Association is to promote harmony.

Many companies whose lines and exchanges are well and properly constructed and equipped with efficient and up-to-date apparatus, suffer immeasurably, and incur the displeasure of the public by connecting with a company whose construction is such as to make it unfit for long distance service. See to it that your construction work is of the best, for the best is none too good, and let it be done under the supervision of competent men. It is not always necessary to employ a high priced engineer, but it is necessary that the man who has charge of your construction work whether he be a professional or an every day trouble man, should understand the work entrusted to him, and permits none but up-to-date methods to be used.

Let this Association adopt a uniform system of construction, in which shall be taken into consideration the number of poles per mile, the soil in which set, the number and length of cross arms to be carried, the number of wires and cables to be supported, and the size and number of guys to be used, and then let every company in the state use only the standard system.

As to the apparatus to be used, whether telephones or switchboards, use only the best. It is sometimes difficult to decide which is the best among the numerous types upon the market, but in making your selection, make it from such apparatus as will stand the test of long distance work.

No matter how purely local may be the service required of your exchange at the first, the date is not far distant when long distance service will be required.

There is a sad deficiency in Wisconsin of copper wires, which fact alone places the state far in the background with our sister states, though the number of Independent subscribers bear about the same proportion to the population.

It is through the operating department that the company comes into direct contact with the public, and here the question of the proper charges to make for tolls and rentals is a serious one. A city of 20,000 population might support an exchange of 200 instruments under the old Bell rates of $3 and $4 per month, and make enormous profits for the Bell Company. The Independent Company would install an exchange in the same city and fix the rate at from 33 per cent. to 50 per cent. less than the Bell rates, and for an exchange of equal size would make large profits; but the reduced prices bring increased patronage, and instead of supplying a subscriber with only 200 connections the company is soon called upon to furnish 500, 1,000 and even 1,500 connections at the cheap rate; whereas the Bell Company under its high prices was limited in the service required to 200 telephones.

Now while it is possible to make good profits on the investment necessary to equip an exchange for 100 telephones in a small place at a monthly rental of $1 per month, and a proportionately larger profit for ten small exchanges of 100 subscribers each, yet to combine those exchanges into a city exchange of 1,000 subscribers and charge but one dollar per month would bankrupt any company in a short time, and yet the public without appreciating that increased connections makes a telephone more valuable, look upon the telephone business in the same light that it does an ordinary commercial transaction and reasons that if a company can make money at a certain rate for 200 connections it should be able to furnish 1,000 or 1,500 connections at a much cheaper rate, while every exchange manager knows that it is just the reverse.

It is currently reported that our present state legislature will enact laws at its present session fixing the maximum rates that may be charged for rentals in cities, according to population. Such a law would be unfair and should be avoided if possible. If a law is to be enacted at all it should be based upon the number of subscribers to an exchange rather than the population of the city, for it is the size of the exchange and not the size of the city which governs the cost.

An attempt was made at the June meeting of this Association to adopt a schedule of toll rates for connecting companies and a basis for a division of the fees among the companies so that every company which contributed to the transmission of a message should receive its just proportion of the fees earned.

The schedule adopted should have been put into effect by every member of this Association, but it was not. That the schedule adopted is not perfect is conceded, but it was an attempt at uniformity.

The Interstate Association at its convention held last December adopted a resolution directing the executive committee and secretary to prepare a uniform schedule and basis of division of fees, and recommend it for adoption to all the state and district Associations in the Interstate territory. As soon as the committee has completed its work the schedule will be submitted, and should be adopted as far as possible. It will not apply to messages transmitted over the wires of a single company exclusively, but will apply to all messages transmitted over the wires of two or more companies. It may not and probably will not be perfect, but it will be a step in the right direction and any imperfections can be corrected at the next Interstate convention.

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*Abstract of a paper read at Wisconsin Association Convention, Milwaukee, Feb. 11 and 12, 1903.

NEW YORK AND NEW JERSEY ASSOCIATION.

DIRECTORS of Independent telephone companies in the vicinity of Middletown, N. Y., and northern New Jersey met at Middletown recently to effect a consolidation of lines for mutual benefit and to discuss other business which might come up for consideration. The capital stock and earnings of each company will be kept separate, the organizations retaining their individuality. The name selected was The Orange and Sussex County Independent Telephone Company Association. It includes the following companies:

The Orange County Telephone Company, of Middletown; the Port Jervis Telephone Company; the Colonial, of Newburgh; the Highland, of Washingtonille; the Sussex County, of Newton, N. J., and the Farmers, of Sussex, N. J.

J. W. Miller, of Newton, N. J., was elected chairman and J. W. Gordan, of Port Jervis, was made secretary, after which officers were elected as follows: President, Michael N. Kane, of Warwick; vice-president, Moses Depew, of Port Jervis; secretary, G. H. Ayers, of Highland Mills; treasurer, W. I. Haggerty, of Sussex, N. J.

The association will hold four meetings a year, and the annual meeting will be held in Middletown in February. The next meeting will be held at Port Jervis the first Thursday in May.

Among those present at the meeting were: George Otis, of Newburgh; George M. Roe, of Chester; W. E. Bailey, W. A. Hynard, G. H. Strong and S. H. Sanford, of Warwick; G. H. Ayers, Highland Mills; Mott C. Tuthill, Washingtonville; P. G. Wagner, J. W. Gordon, Moses Depew, of Port Jervis; Henry Greenfeld, of Sussex, N. J., and J. W. Miller, of Newton, N. J.

RATE LEGISLATION.

REGULATING telephone rates by statute is the aim of a bill recently introduced in the Madison, Wis., city council. It provides schedules for various cities in the State and requires companies to furnish an unlimited service. The schedule for Milwaukee is as follows: For business firms, one party line, $6 per month; two party line, $4.50 per month; four party line, $4 per month. Residences, one party line, $3.50 per month; two party line $2 per month; four party line, $1.50 per month.

For cities of less than 20,000 inhabitants—Business firms, one party line, $4; two party line, $3; four party line, $1.50. Residences—One party line, $3; two party line, $2; four party line, $1.

Cities of less than 20,000—Business house, party line, $2; two party line, $1.20; four party line, 75 cents. Residences from $1 down.

TELEPHONES PRO RATA.

SINCE the Independent telephone companies came into the telephone business and with the accompanying increase of the use of the telephone, almost every day there are new claimants among cities and towns for the honor of having the largest number of telephones in proportion to population. The latest aspirants for this position are Asheville, N. C., and Danville, Ind.

In the former town the Asheville Telephone Company operates. Its officers are: H. P. Proctor, president; W. S. Proctor, vice-president, and C. R. Craig, secretary and treasurer. It has an investment in Asheville and vicinity of over $100,000, and since its advent it has had remarkable success in the fight it has waged against the Bell Telephone Company. At the time of the installation of the plant of the Asheville company the Bell had about 350 telephones in operation in Asheville. It now has less than 100.

In the territory in which the Asheville company operates there are, according to the last census, 13,334 people. In this territory the Asheville company operates 1,028 telephones. This would make a proportion of one telephone to every thirteen persons, including children. Calculating six and one-half persons to the family, the Asheville company has a telephone installed in every other family.

In Danville, Ind., the Danville Mutual Telephone Company operates. It began operation June 1, 1897, with 99 instruments in Danville and a toll station in North Salem, nine miles away. It now has a system comprising 328 business and residence telephones in Danville, 248 farm telephones and 21 toll stations, with about 125 miles of wire.

According to the population of Danville, these 328 subscribers mean that every five people have one telephone, or, calculating that each family consists of six and one-half people, this would indicate that each family has a fraction over one telephone.

TELEPHONE BLOCK SIGNAL SYSTEM.

THE telephone block system which the Southern Pacific Railway planned some time ago to put in between Benicia and Sacramento, Cal., will soon be constructed.

The company already has a block system between Oakland, Cal., and Port Costa and another between Sacramento and Truckee.

The present block system on the line between Sacramento and Truckee has been in existence for a number of years and has given general satisfaction. It covers a distance of 120 miles and is the only one on the telephone plan now used by the company.

In the telephone block system, the method is to have stations established every three to five miles, where some one remains to keep tab on the trains as they pass. When a train goes by, word is telephoned to the next station and no other train is allowed to come in between the two stations until that one has passed the second one. In this manner the chance of collisions is materially lessened.

SUNSET METHODS TO BE INVESTIGATED.

A RESOLUTION has been introduced in the city council of Sacramento, Cal., which calls in drastic terms for an investigation of the methods and general business of the Sunset (Bell)Telephone and Telegraph Company, which is declared to have violated the requirements of its articles of incorporation in many ways. The manner in which the affairs of the company are conducted is declared to be a serious menace to the business of the public. The company's service is also said to have become a public nuisance, instead of a public benefit.

The resolution winds up as follows:

"*Resolved,* That a select committee of five members of the Assembly be appointed by the speaker to immediately and fully, thoroughly and carefully investigate the plants, apparatus and affairs of the said corporation, and the complaints of the public arising from lack of service, and report its findings and recommendations to this House, to the end that the business world and public generally may receive service for value given, and that the said committee be authorized to hold sittings in the cities of San Francisco, Los Angeles, and not exceeding three other places in the State, and that it be authorized to have full power to subpœna witnesses, administer oaths, take testimony, send for persons, books and papers; that a clerk, stenographer and sergeant-at-arms be assigned to said committee; that said committee have leave to sit during sessions of the Assembly together with such other powers as shall be necessary for the full performance of its duties."

YOUNG INDEPENDENT OUTSTRIPS THE BELL.

THE citizens of Rockford, Ill., have just discovered, to their intense surprise, that the Home Telephone Company, which has only been operating in the city for a few months, and which has as yet made no charge for its service, actually has more subscribers than the Bell.

This astounding discovery was made through the investigation of a livery man. The Bell Company, in order to head off its enterprising young rival, had been working for some time on a scheme to get the livery men of the city to use only one telephone, that, of course, being the Bell. Through its agents, the Bell represented that one telephone was all that the livery men needed and that they would be wise if they would use the Bell telephone. It asserted that its system thoroughly covered the field and reached more subscribers than the Home Telephone Company could ever hope to.

The livery men were about won over by these plausible arguments and had just about decided to use only the Bell telephone. One livery man, however, was of an inquiring turn of mind and he decided not to take the word of the Bell Company, but to look into the matter for himself. To his amazement he found the situation was exactly the reverse of what had been asserted by the Bell Company.

By a comparison of the directories of the two companies, he found that the Independent Company had actually a couple of hundred more subscribers than the Bell. In the Bell Company's directory there are 1,490 names. Counting out the repetitions, and those which have been taken out since the advent of the Independent company, the Bell Company actually has less than 1,100 subscribers.

The Home telephone Company has 1,323 actual individual subscribers to whom it is giving service. In addition to this, the order books of the Home Company show over 200 additional subscribers, who will soon be using its telephones.

When these figures had been made public, the liverymen and other merchants of Rockford, who had signified willingness to take the Bell telephone because they thought they would get more for their money, quickly repudiated any intention they had of using the Bell telephone.

"HUSBAND DISPATCHING" BY TELEPHONE.

AN Iowa exchange, in commenting on rural telephones, says: "It will be only a short time until nearly every farmer in the country will have a telephone in his home. The country people have not yet commenced to realize the full benefits of the rural telephones, however. One lady is using the wire in a business way. Whenever her husband starts for town she calls up every house along the line and registers when he passes, tells the city marshal when to run him out of town and registers him by every house all the way home. All she needs is a train sheet to dispatch a whole neighborhood. The benefits of rural telephones are certainly incalculable."

SUES CHICAGO TELEPHONE CO. FOR A NICKEL.

A SUIT has been brought by a Chicago constable against the Chicago Telephone Company, for five cents. The cause of suit happened in this way. The constable went to a public pay station, dropped a nickel in the slot, the operator answered, he gave the number and—then he waited.

Then there was an interval of silence, broken only by a little conversation between the constable and a friend. When the conversation lagged the constable reminded the telephone girl that he was waiting anxiously for his nickel's worth. "I'm ringing them," replied the telephone girl.

This seemed reasonable, and the constable continued to be calm. After another interval he notified the girl that he was still living in anticipation of the time when his nickel would begin to pay dividends. "I'm ringing them," replied the telephone girl.

This seemed quite plausible, so the constable preserved a dignified demeanor and passed a few pleasant words with his friend. After another interval he called the telephone girl's attention to the fact that months seemed to him to have passed since he parted with his nickel. "I'm ringing them," replied the telephone girl, in a cold, metallic tone.

Six different times in succession did the constable inform the telephone girl that his money was lying idle in the depths of the telephone box, and six different times did the telephone girl reply, "I'm ringing them."

Before he could formulate a seventh demand for a hearing she said: "Here's your nickel." A well-regulated automatic nickel-in-the-slot instrument should at that moment have ejected the constable's nickel. But this instrument, the constable alleges, did nothing of the sort. It buzzed and went through all the forms of disgorging, but it kept the nickel.

"Pound on the box," said the telephone girl, when he complained, and he pounded the box, gently at first, not so gently afterward, but no nickel came out.

The suit when first started might have been settled by the telephone company for $3.70. It has now gone to another justice on a change of venue, and the costs are probably $10 by this time.

ATLANTA COMPANY SOLD.

THE Atlanta Standard Telephone Company has been sold at auction for $200,000, the upset price fixed by the United States Court. The plant was purchased by Robert Alexander, trustee, senior member of the prominent Philadelphia law firm, Alexander & McGill. No other bid was received.

The sale was the result of the foreclosure of the mortgage in the hands of the City Trust Safe Deposit and Surety Company, of Philadelphia, the amount being $600,000.

Mr. Alexander, when asked to give the name of his client, stated that at present he could make no statement. Neither could he say what the plans of the purchaser would be in regard to the telephone system. In view of the fact that the majority of the stockholders of the company are residents of Philadelphia, it is probable that Mr. Alexander acted in the interest of these.

The property of the telephone company which was purchased comprised all franchises, wiring, cables, machinery, electrical apparatus, building, exchange fixtures and furniture, leases, conduits, man-holes, cables in the streets, poles, rentals, income and all other properties real and personal.

The Atlanta Standard Telephone company was chartered in 1896 under the laws of the State of Georgia, but did not begin actual operation until 1900.

The company now operates in Atlanta about 2,500 telephones. These are connected by about 500 miles of wire.

STOCK POOL FOR FEDERAL TELEPHONE.

LEADING members of the Everett-Moore syndicate, including H. A. Everett, E. W. Moore, B. Mahler, J. B. Hoge and J. B. Hanna, who own the controlling interest in the Federal Telephone Company, have signed an agreement pooling their holdings in the Federal, says *Finance.* It is provided in the agreement that the stock shall not be sold except through a pooling committee of five and at the discretion of a pooling committee. The main object in tying up the stock is to insure absolute control by the Everett-Moore syndicate until the debts of the company are paid and it is thoroughly financed. It was deemed dangerous to leave the stock in such a position that outsiders could secure control of the company. Another reason that the stock was pooled is because of a belief on the part of the members of the syndicate that if the financing plans are successfully carried out the stock will be a great deal more valuable. It is known that within the last two or three weeks Henry Everett, head of the syndicate, has been a purchaser of Federal Telephone at 2½. The officers of the syndicate will not advise the purchase of this stock for the reason that they regard the chances of the stock making a very large profit at present prices as slim. They say it all depends on the successful outcome of the present financial arrangements, and that buying the stock under present conditions is like betting on a horse race.

OPINION AND COMMENT

INDIA NEEDS AMERICAN TELEPHONES.

INDIA is a place where the American manufacturer does a large and increasing business, which does not yet include telephone material. There is probably, however, a great opportunity awaiting the enterprising spirit who shall undertake the telephonic development of India. A hot climate, populous cities spread out over large areas and inhabited by active business communities, ought to offer favorable conditions for an extensive use of the telephone, if telephone service is provided according to up-to-date methods. These suggestions occur from a review of the latest annual report of the Director-General of Telegraphs for India. For a wonder we have here a government telegraph department that pays, as a profit of over $200,000 was realized, after allowing for depreciation, being equivalent to 4.77 per cent. on the capital expenditure of the department. The report says that in the matter of telephones India is backward compared with certain other Eastern countries—notably Japan. No figures are given as to the actual telephonic development in either Japan or India, but that the development in India is both insignificant and slow is evident from the figures given for revenue. It is stated that the gross revenue of the telephone companies during the year amounted to $154,500, being an increase of only $9,500 on the previous year, the average annual earnings during the last five years having been $137,725.

From these figures the obvious inference is that the telephone is hardly used in India at all, as the amount of revenue given—for all the telephone companies in India—would account for only some three or four thousand subscribers, assuming the rates to range somewhere about forty or fifty dollars a subscriber. When one thinks of great cities like Bombay, Calcutta, Madras, Karachi, Rangoon, and of the many smaller towns of the great Indian Empire, it is evident that the telephone is hardly used at all in India. And at the same time one would think that the conditions of life in Indian cities are such as to make a good and widely developed telephone service an inestimable boon. There is plenty of activity both of business and of social life, and wherever there is business and social activity, there is a demand for quick means of communication. Doubtless in a hot climate rapidity is not at such a premium as it is in colder latitudes and labor is cheap in India, so that messengers are plentiful, and one would probably be told by the old-fashioned Bombay or Calcutta merchant that there is no demand for a large telephone system in Bombay or Calcutta. But that is just where the old-fashioned Bombay or Calcutta merchant would make his mistake.

A good and cheap telephone service practically creates its own demand, and if the demand does not grow rapidly enough to suit an enterprising management, the enterprising management stimulates the demand by methods that rarely fail to bring results. The real reason why telephony is in a state of arrested development in India would no doubt be found, if one could investigate on the spot, to spring from the old story of bad service, high rates and unenterprising management. The telephone companies of India, which are able to collect the magnificent revenue of $150,000 a year out of the telephone service of a great Empire, are probably English companies established some twenty odd years ago and still doing business, after the way of many English companies, according to the methods of twenty odd years ago. There are many of these English telephone companies, with headquarters and a board of directors in London, doing business in various out-of-the-way parts of the world. The worthy directors who meet in London to receive the reports and remittances from their managers abroad are as ignorant of modern telephone methods and possibilities as a babe in arms of the differential calculus, and as they control the policy of the business, the business for the most part stays in the rut that it started in twenty odd years ago.

There is a great opportunity awaiting some telephonic and peripatetic Yerkes who shall one day arise and go forth into the world to gather in all these somnolent British telephone companies and proceed to give India, Egypt, Portugal, Central and South America and various other telephonically benighted parts of the world, the benefit of twentieth-century telephone service. The telephone, in its early days, went from America to England and from England to the rest of the world. In several parts of Continental Europe the telephone service was for a long time run by English companies. In Germany it was made a government monopoly from the first and in France a native company, promoted, however, by Americans and Englishmen, took up the work. But in Austria, Italy, Portugal, Holland and several other countries English telephone companies held sway for a long time and some still persist. English telephone companies were also formed for Egypt, India, and most of the countries of Central and South America, and all of these are still going on—or perhaps it would be more accurate to say that they are still standing still. A telephone system is a profitable business, even if it grows so slowly as hardly to grow at all, so these concerns make profits and pay dividends and are perfectly happy. There is no competition and no incentive to modernize or develop the systems. The managers abroad naturally have but a narrow experience and are practically merely agents of the directors in London, who keep a tight hand on the purse-strings, so there is little chance for an active policy to arise. Altogether there is a great opportunity here.

THE TELEPHONE AS A COMMERCIAL FACTOR.

THERE is a very trite, homely yet sapient aphorism anent familiarity and contempt. Now the march of invention so gradually provides us with ever increasing conveniences and luxuries that we sometime are apt to forget some of our benefits, and retrospective contemplation becomes wise and wholesome. For instance the Telephone—half a life time ago there was not one; to-day a quarter of the population largely depend on it for the transaction of the bulk of their affairs. Instantly sweep it out of existence and the resulting financial effect would pale the crisis of '57 and '72 into utter insignificance. And why? One thinks of Wall Street as the financial heart of the country, but it is only the froth on the wine glass; the real strength of America lies far beneath all the bubble and fizz of lower New York. Touch the crops and Wall Street stops. We are marveling at an era of unprecedented prosperity, but why wonder? During the last decade a million outlying districts have been placed in talking relations with the markets of the world. Even the sea islands receive the latest quotations and profit by the warnings of the weather bureau, as quickly as Mr. Morgan. Now this means knowledge to the masses and knowledge brings success. It is the wine that bears the froth. So long as the great undercurrent of the community makes money, it can spend money, and Wall Street bubbles swim securely. There is no conceivable method whereby intelligence can be transmitted so rapidly, cheaply and surely as by the telephone lines that are rapidly ramifying over the land and are even stretching seaward to marry the islands to the continent; and to this diffusion of information much of our present prosperity may be traced. The South could say and say truly that telephonic quotations and weather warnings had saved her more money than the cost of the entire telephone plant of the country. For this condition the Independent movement is largely responsible. *Verbum sal saprenti!*

CONTEMPORARY CROSS TALK

By *"The Listening-Key."*

THE progressive message rate advocate would listen to this tirade of the conservative flat rater with the courtesy due from one telephone man to another, but with a gleam of amusement in his eye. "You will grant," says he, "that although you allow for an average amount of talking by each subscriber some subscribers talk very much more than others, that some use their telephones only once or twice a day, or even less, and some fifty to a hundred times a day, or even more. Granted that, and it is a condition common to all telephone systems, let us assume that there are some stations that do not talk at all, except to receive messages. Now, a station which does not talk at all requires practically no maintenance, and if this line of argument is carried out to its logical conclusion it may very justly be contended that the entire cost of maintenance of subscribers' stations should be charged to traffic, since it is only for the purpose of originating traffic that they exist and are maintained. Moreover, the cost of maintaining a station will vary more or less directly in proportion to the amount of use made of it, and as it is used only for traffic, why should not station maintenance be charged entirely to traffic?"

Line Costs Charged to Traffic

As to the subscriber's line, the flat rate man is on firm ground there, for the cost of maintaining a subscriber's line is naturally entirely independent of the amount of traffic it carries. "But," says the message rate advocate, "the moment your system grows from one exchange to two, you are introducing a line cost that is chargeable entirely to traffic, for the number and cost of maintenance of your trunk lines will be strictly proportional to the amount of traffic requiring to be trunked." The flat rate man had naturally smiled at the argument that would charge station maintenance to traffic ("never heard anything more ridiculous in my life," was about what he muttered), but at the mention of trunk lines he grew somewhat uneasy, for he knew something about line costs and saw the force of the argument. "Then we come to the exchange," pursued the up-to-date message-rater; now it is admitted that some subscribers talk once a day only and others a hundred times a day. Assume, then, that all your subscribers talk only once a day; a good operator can handle a thousand calls in a day, so if you could construct positions to accommodate a thousand lines, one operator could serve a thousand subscribers. Then assume that every subscriber talks a hundred times a day; in this case each operator could handle only ten lines and your positions would have only ten lines each. In the one case you would have for five thousand subscribers only five multiple sections, and in the other five hundred sections, a difference due entirely to the traffic. The cost of maintenance of the exchange equipment would, of course, be very different in the two cases, and the difference would be due entirely to traffic."

Designed Exclusively for Traffic

Thus there is a very good argument in favor of charging all exchange maintenance strictly to traffic and of making each item of traffic bear its share of the exchange maintenance expense to which it gives rise. Granted that a certain amount of traffic is always reckoned with when an exchange is put up, since no telephone system would be built at all if the subscribers were not going to use the telephones; granted even that there may be a few items of exchange maintenance expense that will vary so slightly with variation in traffic that the change is practically negligible, still the facts remain that the exchange is designed exclusively for the handling of telephone traffic, that its whole design and arrangement and consequently its whole general cost of maintenance will depend on the amount of traffic it is to handle. Therefore to divorce the expense of exchange maintenance from any relation to the volume of traffic that the exchange is to handle is to ignore the obvious—which is one of the obtusest errors that man can commit.

Can be Argued from Both Sides

We have seen that the question of telephone rates can be argued from both sides; in general the thick-and-thin flat rate man wants to charge everything to maintenance, averaging the traffic of the whole system, whereas the out-and-out message-rater wants to charge to traffic every item that is susceptible of the smallest variation dependent on variation in the traffic. It will not have escaped the observation of the acute reader that the moment the system grows to any size, involving much variation in the use by different subscribers, and as soon as trunk working comes in, the weight of the argument inclines to the side of the message-rate advocate. This points to the fallacy on which the flat rate method of charging for telephone service is founded. Briefly put, the flat rate is based on an average, and further, on the assumption that the average will never vary sufficiently to endanger the margin between the average working expenses and the fixed flat rate.

Averages are Misleading

It is hardly necessary to repeat, as we have discussed the question before, that averages are often very misleading. It may be roundly asserted that an average figure is seldom a safe guide unless the figure is arrived at as a result of a large number of observations and unless the divergence between the extreme figures above and below the average is comparatively small and comparatively infrequent. For instance, the average of 1 and 100 is 50.5, but to say that the average earnings of twenty men, of whom ten earn one dollar a day and ten earn one hundred dollars a day, is $50.50 a day each, is to make a statement that, while being technically accurate, has no practical meaning. The average of half-a-mile and a mile-and-a-half is one mile, but to say that the average distance separating a number of points, of which some are half-a-mile apart, and some a mile and a half apart, is one mile, is to make a statement that is absolutely misleading. Now the flat rate for telephone service is based on averages just as misleading as these examples of unmeaning averages.

Lines are of Unequal Length

The subscriber's line, to take the most prominent as well as the most expensive part of any telephone system, varies greatly in length. In all telephone systems there are subscribers next door to the exchange, sometimes even in the very exchange building, whose lines are practically nothing but bits of inside wiring, and there are subscribers as far distant from the exchange as they can get. Yet each pays the same rate. The subscriber who requires a long line usually rebels if he is asked to pay a mileage charge, while the subscriber who is near to or in the exchange building is quick to see that his line must cost very little to establish, and wonders how the telephone company can have the conscience to charge him full rate for his service. In the case of the subscribers' lines, however, the telephone manager has practically no other course but to fall back on averages and let the man who uses a very short line or no line at all help to pay for the man who uses a very long line. To keep the general average down to reasonable figures the telephone manager has to adopt one of two courses; he either draws a circle round his exchange and says that all subscribers outside the circle must pay an additional rate for their lines, or he opens other exchanges, connecting them together by trunk lines, and so obtains a number of districts in each of which the average length of a subscribers' line will remain within reasonable limits.

A Dividing Line Should be Drawn

A custom which is practically unassailable, then, requires the telephone manager, to average his subscribers' lines and charge an equal rate for lines of all lengths within certain limits. The subscribers' station equipment speaks for itself; with ordinary sets of instruments of the same type the average apparently cannot go wrong here, and if extra equipment is wanted extra payment is made. As regards the exchange equipment, although when superficially viewed the system of averages seems to be borne out, it has been shown that there is much room for variation here in the amount of expense a line may cause according to the traffic it originates. A close study of the question brings clearly into view the dividing line, on the one side of which the flat rate is permissible, indeed advisable, and on the other side of which the flat rate should be discarded absolutely. The line should be very sharply drawn, as its position is upheld both by technical and by business reasons.

ELECTRICAL MEASUREMENTS—ARTICLE V—A HOME-MADE GALVANOMETER

By Arthur Vaughan Abbott.

THE instruments described in the previous articles have been representative of their various kinds, but it is easy for one having a little mechanical skill and access to a lathe, to build for himself at little expense an instrument which, while lacking the finish, and the utmost refinement of those illustrated, is still highly serviceable, and far better than the apparatus with which some of the most notable discoveries have been made. For this purpose the following materials are necessary:

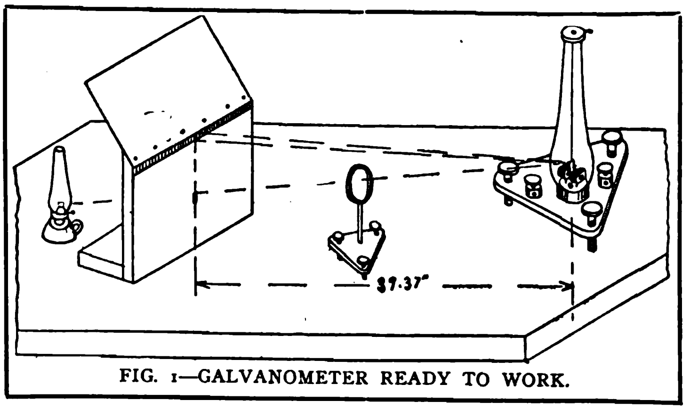


FIG. 1—GALVANOMETER READY TO WORK.

	Cost.
1 Rochester lamp chimney (large size)	$ .25
2 Binding posts	.15
7 Brass wood screws 2 x ¼ inch	.15
1 Convex lens (spectacle glass will do)	.50
2 oz. No. 30 silk-covered wire	1.50
1 Mirror ¾ inch diameter	.25
2 Pieces watch spring 1⅛ inches long	.10
1 Piece clear dry pine ⅜ x 12 x 24 inches	.25
A few wire nails, silk thread, glue straw, white paper and lamp	.00
Total cost	$3.15

The general assembly and method of using the galvanometer is shown in Fig. 1, from which it is seen to consist of four parts.

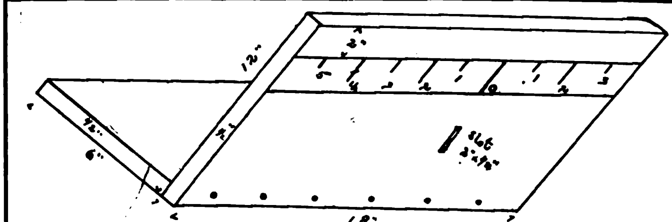


FIG. 2—SCALE.

First, the lamp; second, the scale; third, the lens; fourth, the galvanometer proper. The method of building each of these is now to be described.

First, *the lamp*. Lamps are too common to build; almost any kind will answer. The best is a bicycle lamp, because it gives a powerful beam in one direction, leaving the rest of the room dark; but any kerosene lamp will do, or even a candle at a pinch.

Second, *the scale*. Cut out two pieces of white dry pine (any other wood will do) one, 18 x 12 x ½ inches; the other, 6 x 18 x ½ inches, and nail them together, as shown in Fig. 2. In the center of the 12 x 18-inch cut a slot ¼ x 2 inches. Cut a piece of white paper, or white card or pasteboard 2 inches wide and 18 inches long. Rule a vertical black line in the center of this transversely and mark it O. There will then be 9 inches of cardboard on either side of the O line. Sub-divide these 9 inches into inches, halves, quarters and eighths, just as a foot rule is divided, obtaining 72 divisions on each side of the center O mark. Number these divisions from 1 to 72 on each side, and tack or glue the card on to the outside of the scale board, as shown in Fig. 2, about 2 inches below the top thereof.

Third, *the lens*. At any watchmaker's buy a magnifying glass, from 1 to 1½ inches in diamater, and, if possible, from 12 to 20 inches focal length. An old spy-glass lens is admirable, or a spectacle glass will do. Cut out a piece of pine, as shown in Fig. 3, triangular in shape, 7 inches on each side and ⅜ inch thick. About 1 inch from each corner insert one of the 2 x ¼-inch brass wood screws. Make the screws fit easily, so they can be turned with the fingers, and yet will form three legs, on which the board can stand, and by means of which it can be leveled. Cut out a stick of pine about 4½ inches long and half an inch square, and fasten it in the center of the base board. Roll up some paper into a tube into which the lens will tightly fit, and make it about 3 inches long; crowd the lens into the tube and tack tube on to the stick standing on the base board, and the lens with its adjustable base is complete.

Fourth, *the galvanometer*. Make another base board with leveling screws exactly like the first one. Cut out a round piece of wood about 1½ inches thick, as shown in Fig. 4, and make it a good fit for the inside of the lamp chimney, so that when the chimney is placed over it it will stand firmly. Tack this block in the center of the base board, thus making a stand for the chimney. Turn up *two* wooden spools, as shown in Fig. 5. Both the chimney base and spools can be varied to suit the size of lamp chimney available, but for a large Rochester chimney, the best for this purpose, the sizes will be about as in Fig. 5. Wind each spool full of No. 30 silk covered wire. The particular size of the wire is of no great consequence; anything from No. 20 to No. 38 will do. The wire from some old ringer magnet is excellent.

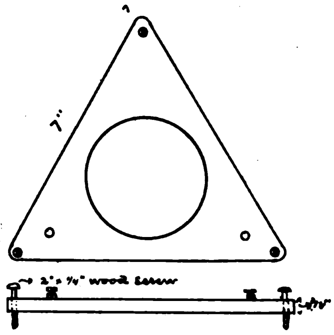


FIG. 3—BASE BOARD.

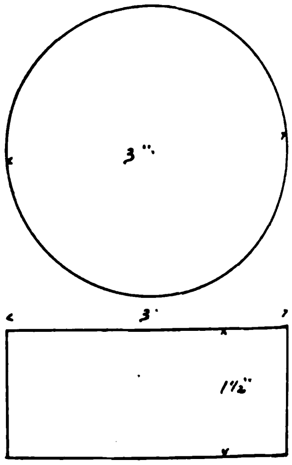


FIG. 4—CHIMNEY BASE.

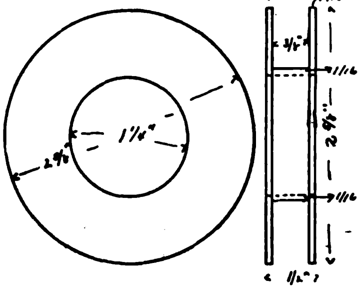


FIG. 5—SPOOL.

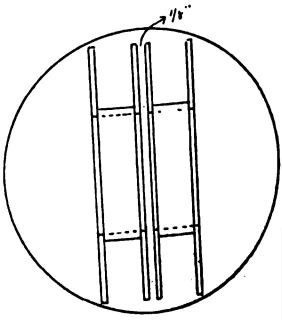


FIG. 6—ASSEMBLY PLAN SPOOLS AND CHIMNEY BASE.

Fasten the two spools on top of the chimney base so that they will be separated about ⅛ inch, as shown in Figs. 6 and 7. Connect the outer end of the wire of one spool to one binding post placed on the base board; the inner end of this coil to the outer end of the secured coil, and the inner end of the latter coil to the other binding post. Cut out a piece of wood ¼ inch thick and 3 inches in diameter, or large enough to cover the top of the lamp chimney. In the center insert the last of the seven wood screws, to end of which solder a small wire hook (made of the same wire as is used for the coil). Put the chimney on the base board over the coils, and the chimney top on the chimney, as in Fig. 1, and the instrument is ready for the needle. This is composed of two pieces of watch spring about 1⅛ inch long, two pieces of split straw about 2½ inches long, a round piece of light card or better, a thin piece of mica cut to a circle 1⅛ inch in diameter, and a small round mirror. The mirror must be purchased at some instrument makers. Cement one piece of watch spring to the center of the card or mica disc with thick shellac. Lay a piece of split straw on each side of the disc and cement them, put the second piece of watch spring between the straws at such a distance as will enable the disc to swing freely in the hole in the center of the coils, and the upper needle clear the top of the spools. Cement the second spring in place and cement the little mirror to the straw just above it. Magnetize each needle by touching it two or three times to the poles of a ringer magnet. Make the *N* pole of the upper needle fall over the *S* pole of the lower one. Take a piece of white floss silk and unravel it, getting if possible a single fibre, and with this suspend the needle from the hook in the lamp cap; place the disc in the hole in the center of the coils and with the screw raise and lower it till it swings perfectly freely. Turn the galvanometer till the needle hangs parallel with the coils. Set the lamp behind the scale in line with the slot, and the little mirror. Move the lens to and fro till there is a sharp image of the slot reflected by the mirror on the O of the scale and the instrument is ready for use.

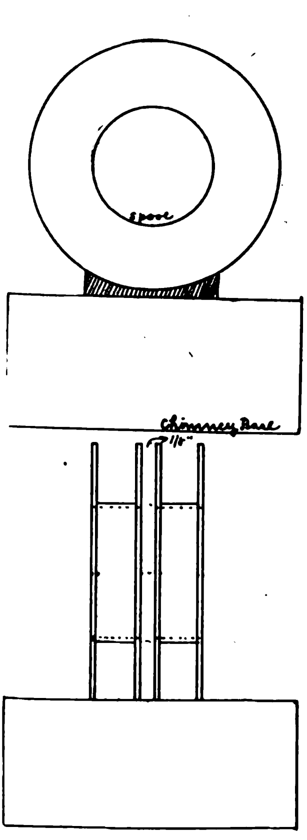


FIG. 7—ASSEMBLY ELEVATION SPOOLS AND CHIMNEY BASE.

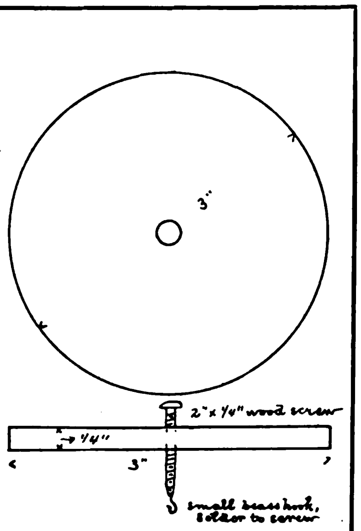


FIG. 8—CHIMNEY TOP.

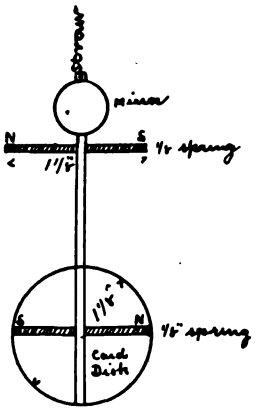


FIG. 9—NEEDLE.

MANUFACTURERS AT WISCONSIN CONVENTION.

TELEPHONE manufacturing and supply houses were very much in evidence at the Hotel Pfister the two days in which the convention was held. They had exhibits of telephones and switchboards and all kinds of telephonic apparatus in the corridors, in the parlors and the rooms of the hotel, and the representatives in charge were kept busy entertaining a large number of visitors.

The Vought-Berger Company, of La Crosse, Wis., had a full and complete exhibit of telephones and switchboards. M. I. Berger and C. M. Dougherty were the representatives.

The American Electric Telephone Company, represented by M. W. Zabel and H. P. Blackledge, had a complete exhibit, but paid particular attention to their four-party selective system.

The Eureka Electric Company's exhibit was in charge of I. J. Kusel and Herbert Rosenow.

The Stromberg-Carlson Telephone Manufacturing Company, Chicago, had a large and attractive exhibit. It was represented by J. J. Nate and A. G. Munsell.

The Standard Underground Cable Company was represented by E. J. Pietzcker.

The American Electric Fuse Company was represented by Frank G. Jones and J. A. Kenny.

The Holtzer-Cabot Company had as representatives E. R. Harding and T. M. Meinema.

The Illinois Electric Specialty Company was represented by F. B. Patten.

The Illinois Electric Company was represented by N. G. Harvery, C. W. Bacon and C. L. Pierce. Its exhibit consisted of Pierce's new telephone tools, terminal heads, etc.

The F. Bissell Company, of Toledo, O., was represented by Mr. Bissell.

The Green Telephone Electric Company, of Milwaukee, Wis., represented by Mr. Whittemore, manufactures interior telephones, and they had a full line on exhibition.

Lindsley Bros.' Company, Chicago, headquarters was in charge of E. A. Lindsley.

Kellogg Switchboard and Supply Company, Chicago, was represented by G. L. Ainsworth. It had its usual good display.

The Electrical Appliance Company was represented by S. A. Dinsmore and J. B. Mullen.

The Chicago Pay Station Company, represented by Mr. Finch, had a good exhibit of pay stations.

The Farr Telephone and Construction Supply Company, of Chicago, was represented by Charles W. Farr.

The Western Telephone Manufacturing Company had an exhibit in charge of James E. Keelyn, C. F. Saunder and W. G. Peacock.

The Williams-Abbott Electric Company, Cleveland, O., was represented by its president, Mr. Sands.

The Scovill Manufacturing Company had an exhibit in charge of its manager, George Kerr.

The Automatic Electric Company, Chicago, had a display in charge of Mr. Crook.

John A. Roebling's Sons' Company's exhibit was in charge of R. B. Abbott, Manager George C. Bailey and W. H. Slingluff.

Julius Andrae Sons' Company was represented by H. J. Meyer, Teddy Andrae and J. C. Schmidtbauer.

The Chicago Telephone Supply Company was represented by Stanley A. Duval. He exhibited the new transmitter that his company has just placed on the market.

The Standard Telephone and Electric Company was represented by J. H. Parrish and W. A. Taylor.

The Sterling Electric Company had a very complete exhibit in charge of F. E. Rotchka.

M. B. Austin & Co., of Chicago, were represented by A. M. Meinema.

The Electrical Supply Company, of Madison, Wis., was represented by L. W. Birch.

The Keelyn Telephone Manufacturing Company, Chicago, was represented by J. E. Keelyn.

The Signalphone Manufacturing Company, of Milwaukee, Wis., was represented by Alfred Weller.

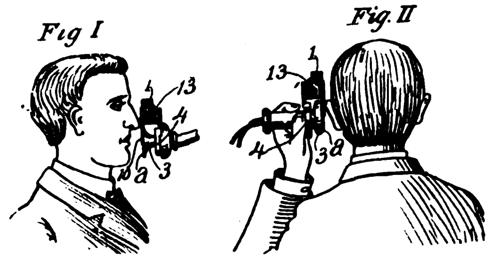
The Westboro Lumber Company, of Westboro, Wis., was represented by C. F. Stout.

THE AMERICAN TELEPHONE JOURNAL was represented by its Western manager, Elmer E. Smith.

Patents

ANTISEPTIC MOUTHPIECE ATTACHMENT.

Samuel J. Ballard, Los Angeles, Cal., patents (No. 719,987), and assigns three-quarters to Calvin W. Brown, a guard for transmitters. The object of this patent is to provide a receptacle wherein antiseptic sheets of paper may be stored to protect either the transmitter or receiver, and collaterally the sheets of paper may be used as advertisements or as memoranda. The device is illustrated in Figs. 1 and 2, Fig. 1 showing the transmitter and Fig. 2 the receiver supplied with a small metallic holder which retains a pack of paper sheets, which may be slipped successively over the transmitter or the receiver.



SIGNALLING APPARATUS.

Edward E. Clement, of Philadelphia, patents (Nos. 719,999 and 719,998), signaling apparatus and system. The object of patent No. 719,999 is to provide an entirely novel method of transmitting signals by electricity. The essential features are shown in Fig. 1, but the inventor describes a large number of circuits in which this device may be employed. The improvement consists in the use of a coherer. There is a local circuit secured by an incandescent lamp *L* and a battery *B* and a coherer *C*. The coherer presents so great resistance that the lamp is not illumined. A line circuit containing a battery *B* and a key *K* is also connected to the coherer. An electrical impulse sent by the key *K* will cause the resistance of the coherer to fall, and the lamp will be illumined. This combination can evidently be applied to a very wide number of uses.

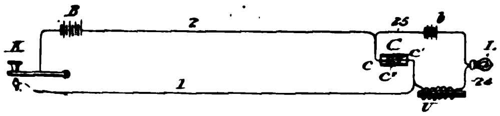


FIG. 1.

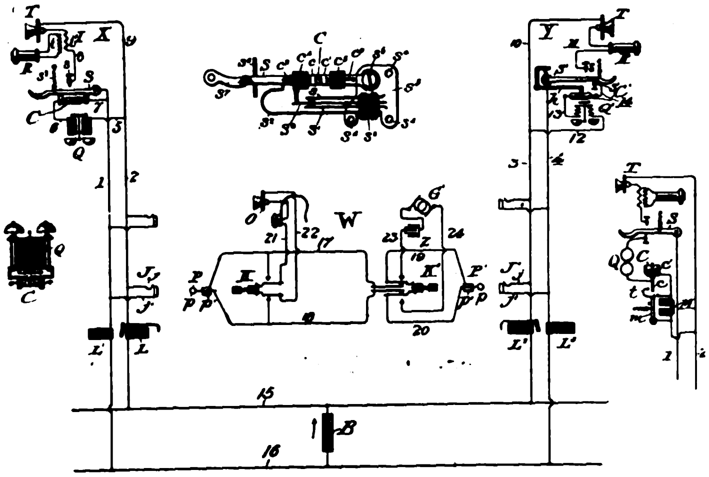


FIG. 2.

Patent No. 719,998 is a special adaptation of the circuits shown in the preceding patent, and has for its object the omission of the condenser at the subscriber's sub-station in the modern telephone system. This patent is illustrated in Fig. 2, from which it will be seen that, at the subscriber's sub-station the ringer *Q* and the coherer *C* are in series across the line. The coherer presents so much resistance that no battery current flows. By the ringing key, central station operator can send an impulse which causes the coherer to cohere and the ringer will then ring. The coherer is in circuit with the switch-hook in the customary manner, and when the telephone is removed the coherer is cut out of circuit.

PAPER CABLE INSULATION.

Roderic F. Hall, New York, patents (No. 720,023), and assigns to the Western Electric Company, an electric cable. The object of this patent is to provide an improved form of insulation for paper cables. It is illustrated in Fig. 1, and consists of a corrugated strip of paper which is applied to the sheet of paper used to insulate the separate cable pairs, thus obtaining a greater separation and a more solid and substantial core.

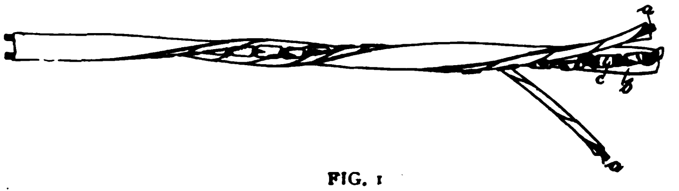
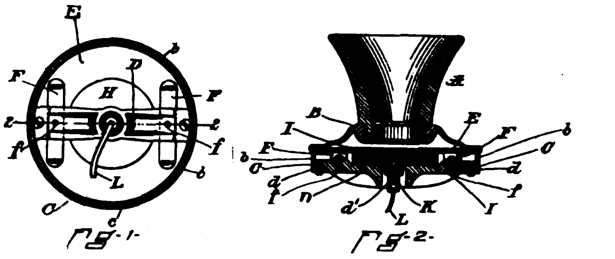


FIG. 1

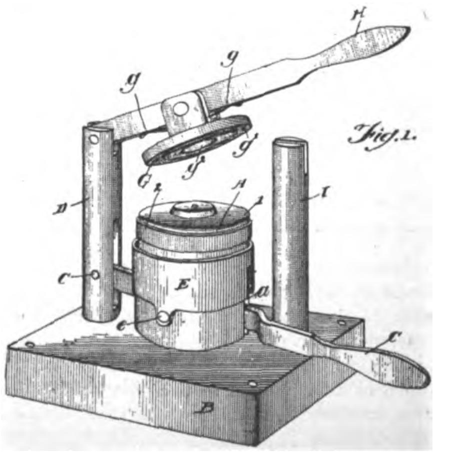
IMPROVED TRANSMITTER.

Frank S. Tucker, of Boston, Mass., patents (No. 720,085), and assigns to the Electric Gas Lighting Company, a telephone transmitter. The object of this patent is an improvement in transmitters, and is shown in Figs. 1 and 2. The improvement consists in the combination of a mouthpiece *A* with a casing *B* and upturned rim *b*. A groove *C* upon this rim, a slot *c* above the groove, a diaphragm *C* resting in the casing, a carbon receptacle resting upon the diaphragm and a bridge having ends adapted to sliding in the groove *C*. This combination, it is claimed, has its parts so arranged as to improve articulation.



MACHINE FOR APPLYING ELASTIC BANDS.

Michael Setter, Chicago, Ill., patents (No. 720,493), and assigns to the American Electric Telephone Company, a machine for applying elastic bands to articles of manufacture. The object of this patent is to provide a machine for supplying elastic bands to the diaphragms of receivers, transmitters or similar instruments. It is illustrated in Fig. 1. There is a base *A* upon which the diaphragm may be placed. A sliding collar *E* operated by the lever *C* serves to center and hold the diaphragm while the platen g^1 contains the rubber band and places it upon the diaphragm.



The Week's Messages.

NEW COMPANIES

BALD KNOB, ARK.—The Bald Knob Telephone Company has been incorporated with a capital stock of $5,000, which may be increased. Nearly twenty towns in Jackson, White, Cleburne, Prairie and Independence counties are to be connected by long distance telephone. The objective points of the new line are Heber, Cleburne county; Searcy and Des Arc, on the south; Newport, Jackson county, and Pleasant Plains, Independence county, on the north. The circuit will be several hundred miles. Among the points touched are Bald Knob, New Augusta, Judsonia, Searcy, Russell, Bradford, Newport, Pleasant Plains, Denmark, West Point, Des Arc, Heber and other intervening points. The headquarters will be in Bald Knob. The officers and incorporators are: E. R. Wynn, president; George Dickey, vice-president; L. G. Wynn, secretary and treasurer. It is understood that construction work will begin immediately.

AUGUSTA, GA.—Articles of incorporation have been filed here by the St. George Telephone Company, with a capital stock of $5,000.

EAST ST. LOUIS, ILL.—The St. Clair and Eastern Telephone Company, with headquarters here, has been incorporated with a capital stock of $10,000. The incorporators are E. M. Evans, C. E. Wise, C. A. Combs.

MARISSA, ILL.—The certificate of incorporation of the Marissa Telephone Company, capital $2,500, has been filed in the county recorder's office. The incorporators are J. A. Hamilton, Henry Finger, R. S. Coulter, A. C. Elder, R. P. Jensen and A. J. Mathews.

MARTINTON, ILL.—The Local Telephone Company, of Martinton, has been incorporated with a capital stock of $10,000. Incorporators: Horace Barton, J. L. Shaw and E. C. Vanderpoorten.

CORY, IND.—The Cory Southeastern Telephone Company has been organized to establish service between Saline and Cory. Officers have been elected as follows: James French, president; Thomas Nees, vice-president; Albert M. Diel, secretary; Marion McCullough, treasurer; Isaac French, Benjamin Jackson and Elmer Modesitt, board of managers.

INDIANAPOLIS, IND.—The Blue River Telephone Company, headquarters at Friends' Church, Hancock county, has been incorporated with $120 capital. Oliver Binford, Omar Binford and E. Clarkson Elliott are directors.

HUNTINGTON, IND.—Citizens of Andrews have organized a home telephone system for the town and surrounding country. B. L. Snowden is president of the company.

KNOX, IND.—The Winona Telephone Company, headquarters at Knox, has been incorporated with a capital stock of $30,000. The directors are: Samuel Tomlinson, Albert B. Diggs, William S. Daniels, R. A. Tomlinson and S. A. Tomlinson.

OAKLANDON, IND.—The Oaklandon Western Telephone Company has been incorporated with a capital stock of $1,000. Directors: John Moore, John M. Emery, F. M. Kimberly, Henry Alford, J. T. Newkirk, O. A. Klepper and T. A. Silver.

OSCEOLA, IA.—The Farmers' Mutual Telephone Company has been organized here with a capital stock of $1,100. J. L. Baldwin, president; C. B. Eggleston, secretary.

SLOAN, IA.—Articles of incorporation of the Sloan Telephone Company of Sloan have been filed with the Secretary of State. The organization is by H. D. Buckley and others, with a capital of $4,000.

GREENVILLE, KY.—C. F. Shelton, of Bancroft, is securing subscriptions to run a telephone line from Greenville to Bancroft, five miles southwest. The people of the neighborhood are going into it heartily, and the business men in town are also aiding liberally.

KNOX, ME.—The Knox and Montville Telephone Company has been incorporated. The purposes of the corporation are to erect and maintain a telephone line between Knox Corner and Montville, and between North Montville and Freedom village. The amount of capital stock is $10,000. The directors are: James H. Vose, B. F. Foster, F. A. Myrick, H. B. Clement, C. A. Hall, Martin Whitten and E. F. Banton. J. H. Vose is president; C. A. Hall, treasurer; Newell White, clerk.

ONONDAGA, MICH.—A new telephone company has been organized at Onondaga, with Frank Gukland as president.

DUBOIS, NEB.—The town of Dubois has now an Independent telephone company, with a capital stock of $5,000. Incorporators are: J. A. Williams, Oscar Vanier, John Lang, Otto Stepanek, H. H. Hawkins, P. J. Stiefer, Joseph Berenek, Perry Frazier and Frank Pesek, Jr.

NEW BRUNSWICK, N. J.—Articles of incorporation will shortly be filed by the People's Co-operative Telephone Company. The People's Company will build a local service as soon as a franchise is granted by the board of aldermen. It promises to furnish office telephones on an individual wire at a rate not exceeding $36 a year and for dwellings at a rate not exceeding $18 a year. The company intends to branch out into Union county after it has covered Middlesex county.

PULTENEY, N. Y.—The Pulteney-Branchport Telephone Company has been organized, with a capital stock of $1,000. Directors: W. E. Cook, N. R. Miller and J. M. Hall, of Pulteney.

WAYLAND, N. Y.—The Wayland Independent Telephone Company of Wayland, Steuben county, has been organized, with a capital stock of $5,000. Directors: G. M. Peabody, G. E. Whiteman and Alexander Engel, of Wayland.

WYOMING, N. Y.—A local telephone company has been organized, with the following officers: E. B. Belknap, president; H. Howes, vice-president; Chas. H. Seaver, secretary, and Chas. A. Lamb, treasurer. The company will be incorporated, probably with a capital stock of $1,000. It will construct a local system and give connection to lines built to the city limits by country subscribers, who will purchase their own instruments and construct their own lines. Only the best material will be used throughout.

BRADFORD, O.—The Bradford Telephone Company has been incorporated with a capital stock of $20,000. Incorporators: Z. T. Myers, J. B. Miller, Stephen Day, W. Day, W. E. Williams.

HANNIBAL, O.—A new telephone company has been organized, which will be known as the Hannibal and Round Bottom Telephone Company. A charter has been granted.

MUHLENBURG, PA.—The subscribers of the proposed telephone company met at Muhlenburg recently and effected an organization as follows: President, Dr. C. A. Long; vice-president, R. M. Tubbs; secretary, C. B. Wheeler; treasurer, H. E. Campbell; directors, W. I. Wilkinson, G. T. Gregory, Harvey Simons, H. E. Campbell, J. L. Glace, James W. McDonald and Albert Sutliff; auditors, James Crockett, J. N. Culver and J. F. Kleckner. The entire Huntington Valley will undoubtedly soon be covered by a complete telephone system, enough stock having already been subscribed to build twenty miles of line.

MOUNTAIN CITY, TENN.—T. P. Crow, of Mountain City, has organized a company and will build a telephone line from Mountain City to Bristol. The line will be routed via the large lumber mills in Shady Valley.

ENNIS, TEX.—The Central Toll Line Telephone Company of Ennis, capital stock $30,000, has been organized. Incorporators: W. L. Harper, Charles Pippen, Tom Schaffer, of Ennis; A. E. Schaffer, H. Goecke and G. A. Hoskins, of Wapakoneta, O.

MADISON, WIS.—The Wind Lake Telephone Company of Norway has been incorporated with a capital stock of $3,000. Incorporators: Charles J. Flett, J. Elmer Jacobson and Otto E. Schmidt.

MILWAUKEE, WIS.—Articles of incorporation of the Badger Telegraph and Telephone Company, with a capital stock of $150,000, Charles C. Russell, H. J. Droppers and E. L. Richardson, incorporators, have been filed here.

WERLEY, WIS.—The Werley Telephone Company has been organized here. Officers: Fred Waltz, president; Aug. Wellner, secretary; Fred Freymiller, treasurer.

THE WEEK'S MESSAGES—Continued.

FINANCIAL.

ROCHELLE, ILL.—The Ogle County Telephone Company, of Rochelle, has increased its capital stock from $60,000 to $100,000.

SHREVEPORT, LA.—The Shreveport Telephone Company has increased its capital stock from $300,000 to $500,000.

FARMINGTON, ME.—The directors of the New Portland and Farmington Telephone Company have voted to increase the amount of its capital stock to $5,000.

BOSTON, MASS.—The directors of the New England Telephone and Telegraph Company issue the following statement of earnings for the year ended December 31, 1902, compared with 1901 and 1900:

	1902.	1901.	1900.
Gross revenue..............	$6,024,610	$5,177,412	$4,518,396
Operating expenses.........	4,855,840	4,139,929	3,621,644
Net revenue..............	$1,168,769	$1,037,482	$896,752
Dividend, at 6 per cent.....	1,108,727	947,406	838,635
Balance of rev. over divs....	$60,043	$90,076	$58,117

Capital stock has been sold during the year to the amount of $3,593,200, making the issued capital at the close of the year $21,616,700. The number of exchange stations operated by the company was 111,774, an increase during the year of 17,952.

KENTON, O.—The capital stock of the Kenton Telephone Company has been increased from $50,000 to $100,000.

WEST ALEXANDRIA, O.—The capital stock of the West Alexandria Telephone Company has been increased from $3,000 to $100,000.

DENISON, TEX.—W. B. Richie, treasurer, and C. T. Crites, secretary of the Grayson County Telephone Company, with headquarters at Lima, O., are in the city looking after the company's various interests. The capital stock of the company is to be increased from $170,000 to $340,000. The lines of the company in this city and Sherman are to be extended and improved.

RATES.

CHICAGO, ILL.—An injunction order issued by Judge Tuley a year ago restraining the Chicago Telephone Company from charging more than the franchise rate for the use of telephones has been affirmed by the Appellate Court.

FRANCHISES.

FOREMAN, ARK.—The city council of Foreman has granted the Schooler Bros., of Blossom, Tex., and Hugo, I. T., a franchise for a local telephone system.

LONG BRANCH, CAL.—The Home Telephone Company of Los Angeles has obtained a franchise here.

LOS ANGELES, CAL.—Arthur E. Wright, agent for the United States Long Distance Telephone Company, has been awarded a fifty-year franchise on his bid of $301. The company is the long distance branch of the Home Telephone Company. The terms of the franchise are such as to preclude the possibility of a monopoly, as the holder of the rights of way, etc., must permit other and competing lines to attach their wires to the same poles for a nominal rental yearly. By the provisions of the franchise at least $40,000 must be expended during the next four years by the company acquiring possession of the rights, said company to submit to the board at regular intervals an itemized statement of expenditures to show that not less than $10,000 a year is expended in improvements. Schedules of prices also are set forth, permitting the company to charge incorporated towns outside of Los Angeles from $26 a year for a system of 100 subscribers to $51 a year for a system of more than 1,000 subscribers.

SANTA ANA, CAL.—Arthur Wright, supposed to represent the Los Angeles Home Telephone Company, has asked for a fifty-year franchise here and over the public highways of Orange county. The franchise provides that $10,000 shall be expended in the next four years, and that thirty miles of lines shall have been constructed.

TALLAHASSEE, FLA.—Letters patent have been issued by the Governor for the Indian River Telephone Company of Fort Myers, whose object is to construct a long distance telephone system from Miami, in Dade county, to Titusville, in Brevard county, 210 miles.

SWAYZEE, IND.—J. E. Burge, of Sweetser, and T. W. Johnson, of Herbst, appeared before the council recently and asked for a franchise for the Sweetser Telephone Company to operate its lines within the corporate limits.

WEST BRANCH, IA.—An ordinance has been introduced to the town council granting a twenty-five-year franchise to the Farmers' Mutual Telephone Company to erect poles and string wires here.

KALAMAZOO, MICH.—The city council has granted a franchise to the Citizens' Telephone Company of Kalamazoo to construct and operate a telephone system.

ST. PETERS, MINN.—At a recent meeting of the city council the Minnesota Valley Telephone Company was granted a franchise. Dr. J. H. James is president of the company. The franchise is for twenty years, but does not grant authority for a local exchange, and simply allows the company to run its line through the city and establish a toll station.

CAMDEN, N. J.—The Eastern Telephone and Telegraph Company has been granted a franchise to erect poles, string wires and construct underground conduits in Pilesgrove township, Salem county.

NEW BRUNSWICK, N. J.—The People's Co-operative Telephone Company will shortly ask New Brunswick for a franchise.

WALDO, O.—Messrs. Crow and Odaffer, representing the Marion County Telephone Company, have been granted a franchise by the council to operate here. This company has negotiations under way for the purchase of the Ashley line. Until this can be done connections will be made with this line and all subscribers will be given an all-county service.

PORTLAND, ORE.—Warren E. Thomas has asked the city council for a twenty-five-year telephone franchise. He represents an Independent company.

CLARKSVILLE, TENN.—Attorney Dancey Fort was in Springfield recently, where he secured a franchise to build a new telephone line in that city. The city council of that town granted the franchise to D. Fort, R. B. Crane and W. G. Nagel, who are constructing the new system here. Mr. Fort said that work on the system would begin as soon as possible. It is proposed to erect an up-to-date system, the cost of which will be about $20,000.

LOGAN, UTAH.—The Home Telephone Company's petition for a franchise here will be voted on by the citizens at a special election.

SEATTLE, WASH.—The Independent Telephone Company of Seattle, which has been in operation for the past six months, has acquired franchises to operate in all the leading cities on Puget Sound in order to give its patrons the benefit of a long distance service.

ELECTIONS.

CARTHAGE, IND.—The Ripley Farmers' Co-operative Telephone Company held its annual business meeting at Carthage recently. The same directors were retained for another year and two additional ones, W. N. Bassett and O. S. Henley, were elected.

CLARKSHILL, IND.—The Clarkshill Co-operative Telephone Company has elected the following new officers: J. M. Zion, president; William Hudson, vice-president; Kirk Lindsey, secretary; G. W. Haines, treasurer.

CLARINDA, IA.—The stockholders of the Clarinda Short Line Telephone Company, at a recent meeting, elected Al. Davison, president; J. H. Finley, vice-president; J. K. Harlan, treasurer, and F. V. Hensleigh, secretary.

BALTIMORE, MD.—The directors of the Maryland Telephone and Telegraph Company organized by electing the following officers: George R. Webb, president; David E. Evans, vice-president; Stanley Baker, secretary; R. F. Bonsall, treasurer; George R. Webb, David E. Evans, John T. Stone, C. I. T. Gould and Frank H. Callaway, executive committee.

DARIEN, N. Y.—The Darien Rural Telephone Association has perfected its organization by electing the following officers: D. C. Young, president; A. F. Richley, vice-president; E. J. Shirm, secretary; Nelson Harper, treasurer; Carlton G. Fisher, O. B. Yates, F. M. Rogers, W. H. Harmon, F. W. Richley, executive committee. Right of way has been secured from the Darien postoffice to Griswold Station, Darien Center and Sawens and D., L. & W. station to the Lehigh postoffice, south to North Darien.

DEPOSIT, N. Y.—The Beebe Hill Telephone Company has elected the following officers: L. L. Conrow, president; E. C. Briggs, treasurer; C. E. White, secretary.

FRANKLINVILLE, N. Y.—The Franklinville Telephone Company at its annual meeting elected the following officers: W. W. Waring, president and manager; W. W. Sill, vice-president; E. G. Kingsley, secretary and treasurer. The board of directors consists of W. W. Sill, M. H. Wade, Dr. Charles Randall, E. G. Kingsley, of Franklinville, and Russ Hubbard and W. C. Williams, of Farmersville.

PERRY, N. Y.—The Perry Telephone Company has elected the following officers: C. M. Smith, president; Chas. A. Toan, vice-president; L. P. Benedict, secretary and treasurer; C. W. Smith, manager; C. M. Smith, W. W. Grieve, L. P. Benedict, C. A. Toan, F. D. Fanning, C. W. Smith and C. G. Clarke, directors.

SARANAC LAKE, N. Y.—The Franklin Telephone and Telegraph Company has elected these directors: Frank E. Kendall, John Harding, Alfred L. Donaldson, Wm. J. Callahan, Milo B. Miller, Frank M. Jackson and Herbert P. Coats. These officers were elected: Alfred L. Donaldson, president; Milo B. Miller, vice-president; Herbert P. Coats, secretary; Frank M. Jackson, treasurer.

THE WEEK'S MESSAGES—Continued.

PHILADELPHIA, PA.—The annual meeting of the stockholders of the United Telephone and Telegraph Company was held recently. During 1902, it was stated at the meeting, the United Telephone and Telegraph Company earned a large surplus over the amount necessary to pay the interest upon its bonded indebtedness, but the money was used entirely upon the extension of its lines and the improvement of its plants. Numerous traffic arrangements were reported as made during the year. The following were elected directors for the ensuing year: Richard G. Park, West Chester; W. G. Park, New York City; W. D. Barnard, St. Davids; Ward R. Bliss, Chester; J. Frank Black, Chester; J. M. Clement, Northumberland; Ellis L. Orvis, Bellefonte; S. P. Light, Lebanon; H. H. Light, Lebanon; F. G. Hobson, Norristown; E. M. Yarnall and Edward Davis, Philadelphia; E. M. Leader, Shamokin; F. C. Angle, Danville; D. McK. Lloyd, Pittsburg; A. J. Horner, Lancaster; W. W. Ryon, Shamokin; Geo. W. Taft, Kennet Square; B. F. Myers, Harrisburg; G. R. Van Allen, Northumberland; H. S. Thompson, Pottsville; W. D. Detweiler, Harrisburg; John B. Roach, Chester. The board of directors immediately organized by electing Richard G. Park president; W. D. Barnard, vice-president; E. A. Scott, secretary, and S. R. Caldwell, treasurer.

GARTH, VA.—The subscribers to the Owensville line of the Albemarle Mutual Telephone Company met recently and elected the following officers: S. A. Calhoun, president; E. F. Rodes, secretary and treasurer. The company decided to begin work on its line at once. The Free Union Line had a representative at the meeting, and arrangements were made by which they will use the same poles from here to Charlottsville.

COMPETITION.

ROCKFORD, ILL.—The Home Telephone Company will in future receive as much favor at the hands of the city as possible. The report of the special committee to make up a list of places where the Central Union instruments can be displaced by the Home Company's telephones has made its report and the council voted to substitute thirty-two of the latter for an equal number of the former. This will materially reduce the cost of city telephones and will pay quite a sum of money to the Home Company. The report of the committee recited that the 2 per cent. compensation to be paid by the new company would be about $550, practically what is now paid for telephone rent each year.

CANTON, MO.—The city council has blocked the plans of the Central Union (Bell) Telephone Company to run a line through here and a submarine cable across the river, by refusing it a franchise.

POUGHKEEPSIE, N. Y.—The Duchess County Telephone Company has been awarded the contract for furnishing the Gamewell police and fire alarm signal box system to the city in place of the Hudson River (Bell) Telephone Company.

COMBINATIONS.

ANCHOR, ILL.—Dr. William A. McIntosh has sold out his telephone business and lines to a number of farmers, who will organize a company known as the Anchor Telephone Company.

EUREKA, KAN.—Brinkerhoff & Edwards have bought the franchise and good will of the Greenwood County Mutual Telephone Company, and now have an open field for operation in Eureka. As yet the Mutual people have strung no wires and the transfer merely involved the recently acquired franchise of the new company.

OSBORNE, KAN.—It is reported that the Osborne Telephone Company is about to purchase the long distance line of the Downs Western Telephone Company, which includes 236 miles. The line extends from Norton to Plainville via Downs, Osborne and Stockton.

COLUMBIA, N. Y.—Ex-Sheriff Best and W. A. Mallery have sold out the new telephone line between Hudson and Hillsdale to the Columbia Telephone Company.

UNDERGROUND

SYRACUSE, N. Y.—C. J. Sullivan has been given a contract by the Syracuse Telephone Company for placing underground the wires of the company where they cross the Erie Canal at Salina street. The water is now being drawn from the canal and the work will be done at once. The wires will occupy nine iron ducts under the canal, connecting with a manhole at either side of the waterway.

CONSTRUCTION.

BARTOW, FLA.—The Peninsular Telephone Company is making extensive additions to its exchange here. Its business has increased beyond its expectations.

CARROLLTON, GA.—The Georgia division of the Gainesboro Telephone Company, of this city, is building a branch of its line to Newnan, twenty-five miles south of here. The lines will go by way of Clem, Banning and Whitesburg, towns in this county, and Sargents and into Newnan, in Coweta county.

BROADWELL, ILL.—A. F. Eisiminger will install a switchboard here.

COTTAGE GROVE, ILL.—The Cottage Grove Independent Telephone Company will erect a line to Eldora shortly.

ODELL, ILL.—The Odell Automatic Telephone Company recently installed 100 telephones, and will soon begin constructing party lines.

BLUE LAKES, IDAHO.—A telephone line is about to be constructed to Blue Lakes and Milner, the town that will be the headquarters of the Twin Falls enterprise. I. B. Perrine, of Twin Falls, is the promoter of this enterprise.

AVOCA, IA.—The Harlem and Avoca Telephone Company contemplates the extension of its lines to Omaha and South Omaha, Neb., early in the spring. The extension will be a copper circuit and will connect with the Independent telephone system now established in South Omaha. The company is planning to construct a number of new lines, several of which will run from Avoca into neighboring territory and to adjoining towns. It is stated to be the desire of the Independent systems to reach South Omaha through Council Bluffs and Omaha, and to establish exchanges in both these cities. With this end in view, application for a local franchise will be made within a few weeks.

PIPESTONE, MINN.—At the annual meeting of the stockholders of the Southwestern Minnesota Telephone Company held recently it was resolved to place $25,000 of the treasury stock on the market to provide for future extensions, the most of which stock will undoubtedly be taken up by local parties.

LA GRANGE, MO.—The Lindale Telephone Company is constructing a line from here to Weber.

STEFFENVILLE, MO.—The Glover Telephone Company has poles erected for a new line and will string the wires in the near future.

DEMING, N. M.—C. B. Bosworth, agent of the Southern Pacific at Deming, is organizing a telephone exchange for this city and is meeting with success in his venture.

DRYDEN, N. Y.—At an important meeting of the Dryden-Slaterville Home Telephone Company it was announced that enough stock has been sold to insure the commencement of construction at an early date. The following directors were elected: George Cole, Webb Corbin, Charles Pratt, Harvey Loomis, Adelbert Scott, Archie Chatfield and A. J. Slater. All of the directors live on the line of the projected service. The line will run from Dryden through Willow Glen and Irish Settlement to Slaterville Springs.

ROME, N. Y.—The Broadford County Telephone Company, with headquarters at Towanda, Pa., has a force at work on the line from Rome to Nichols.

ST. JOHNSVILLE, N. Y.—The Inter-State Telephone Company is enlarging its system here.

GUYSVILLE, O.—The Guysville Telephone Company is extending a number of branch lines to connect with the switchboard at Rome Center.

SHELBY, O.—The cable of the People's Telephone Company is giving the company considerable trouble, and Manager Howk states that it may have to be replaced. It cost $1,600.

ST. MARYS, O.—The St. Marys Telephone Company has decided to rebuild the entire plant, and also to increase the capacity of the plant to meet the growing business.

ALTOONA, PA.—The United Telephone and Telegraph Company, of Philadelphia, has planned to spend $250,000 in this vicinity this spring and summer. The improvements consist of a new trunk line between Altoona and Harrisburg, one from Bellefonte to Tyrone and Huntington, one from Clearfield to Tyrone, the establishment of an exchange at Bellwood, with a line to Lloydsville, Blansburg, Coalport and Irvona, and a line from Hollidaysburg to Williamsburg. Central exchanges are being placed at Clearfield and Phillipsburg.

WILKESBARRE, PA.—Business with the new People's Telephone Company continues to increase at a wonderful rate, necessitating the addition of another section to the switchboard, making six sections. As soon as the new line is completed from Centremoreland to Tunkhannock and Laceyville the entire People's system can then be connected with extensive trunk line systems for all points in New York State to Buffalo and all Western cities. The manager is Willard Felts.

FREDERICKSBURG, VA.—The directors of the Upper Rappahannock Telephone Company met here recently and decided to run the line across the Rappahannock River at Port Royal to King George county, connecting both sides of the river.

ARCADIA, WIS.—The annual meeting of the Western Wisconsin Telephone Company was held here recently. The business of the past year was satisfactory and a number of substantial improvements are contemplated, among which is copper wiring the main line from Winona to Blair. The following stockholders from Independence were in attendance: John Sprecher, A. Garthus, A. W. Liver, C. Torgerson and A. Senty. The old directors and officers were all re-elected.

THE WEEK'S MESSAGES—Concluded.

MISCELLANEOUS

BROWNSVILLE, IND.—The incorporators of the Brownsville Co-operative Telephone Company, recently incorporated with $2,000 capital stock, are: Wendell H. Hawkins, Daniel Paddock, Harlan B. Quinn, Rufus E. Lambert, Charles Brown and John A. Rodenberg, all of Abington; Spencer Stephens, Isaac F. Webster, John F. Bell, Frank Bell, Levi W. Keller, Clarence S. Ryan, Charles O. Leab, B. B. Vernon, Charles M. Bell and Martha McClane, all of Brownsville, and Wilbur J. Doddridge and J. M. Doddridge, of Milton.

GUEYDAN, LA.—An effort will be made to have the Hodgset Telephone Company extend its line from Abbeville through Gueydan to Crowley.

JACKSON, MICH.—January was a prosperous month for the Citizens' Telephone Company. On February 1 the company had 1,447 telephones connected, 206 new contracts having been made during January. There were also over 50 unfilled orders for telephones on hand. Over 60 miles of wire was strung during January, and 8,300 feet of 100, 200 and 300 pair underground cables were put in. There is now ordered 19,900 feet of 25, 50 and 100 pair aerial cable to take care of the increase.

YORK, NEB.—The York County Telephone Company has completed a line to Stromsburg and is now making a personal canvass of its territory for subscribers.

BRANCHVILLE, N. J.—The Farmers' Telephone Company has extended its line to this borough, and has been placing telephones in a number of the business places in town.

THOMAS, O. T.—The local telephone system is now in operation. Seventy-five telephones are connected with central. The owners of the system are Riley, Mitchell & Co., late of Clay county, Missouri.

ALLENTOWN, PA.—The Lehigh Valley Telephone Company is now preparing to carry on an active toll business between this city and Philadelphia as well as intermediate points. Five lines now connect this city with the metropolis through the exchange at Fort Washington, recently installed.

COLUMBIA, PA.—The Columbia Telephone Company has opened up its long distance lines for the public to Harrisburg, Altoona and the West; Williamsport, Shamokin, Sunbury, Pottsville, Scranton, and all the principal points in Pennsylvania, including Philadelphia; also to Baltimore, all through Maryland; Wilmington and all of Delaware; Virginia and West Virginia; also all points in New Jersey.

WASHBURN, WIS.—Representatives of the Home Telephone Company of Ashland were here recently looking over the ground, with a view of entering Washburn.

PERSONAL

DAVENPORT, IA.—Alfred Slater, formerly with the Wisconsin Telephone Company, at Janesville, has been appointed manager of Independent Telephone Company in place of William Fitzgerald, resigned.

DES MOINES, IA.—C. C. Deering, of Boone, has accepted the position of manager of the Mutual Telephone Company.

NEWTON, N. J.—John D. Campbell, who was manager of the Sussex Telephone Company in Newton, has resigned his position.

BUFFALO, N. Y.—J. B. Ware, formerly of Detroit, Mich., has identified himself with the Consolidated Telephone Company of Buffalo and the Inter-Ocean Telephone Company in the capacity of secretary. The latter company is constructing the long distance toll line between Buffalo, Rochester and Syracuse, on the north, and by Jamestown and Cortland, on the south, with lines connecting the two systems together; also connecting with the United States Telephone Company on the west for Ohio and Indiana business, and eastward to Albany.

ROME, N. Y.—J. B. Middleton, superintendent of the Rome Home Telephone Company, has accepted a position with the Duluth, Minn., Independent Telephone Company as manager.

SCHENECTADY, N. Y.—The resignation of Howard Hendrickson as president of the Schenectady Home Telephone Company was received at a meeting of the stockholders, and Charles F. Veeder elected to succeed him. It was decided to increase the directorate of the company by the election of the following: Charles S. Veeder, Charles E. Palmer, E. S. Kellogg, Charles Hecquembourg, John F. Deems and Robert McFarland. The secretary,treasurer, F. S. Strong, presented his report, showing that the organization is in a prosperous condition.

TRADE NOTES

THE CHICAGO & NORTHWESTERN RAILWAY has fixed a fare of $33 from Chicago to points in Colorado, Utah, Oregon, Washington and California. This price is from February 15 to April 30. Pullman tourist sleeping cars run daily to San Francisco and Portland. Excursions personally conducted; choice of routes.

THE KELLOGG SWITCHBOARD AND SUPPLY COMPANY has furnished eleven additional switchboard sections for the Frontier Telephone Company, of Buffalo, which will soon be in full operation.

THE AUTOMATIC ELECTRIC COMPANY, of Chicago, has recently shipped to the Mutual Automatic Telephone Company, Albuquerque, New Mexico, a switchboard of 1,000 ultimate capacity with 400 telephones and switches for present installation. The city of Albuquerque has had automatic telephone service for seven years, the local company having purchased one of the early types of Strowger switchboards. The new equipment was purchased to meet the demand for service beyond the capacity of the switchboard which has been in use.

PLANTS FOR SALE

Advertisements under this head **$1.00** *for 25 words or less for each insertion. Prepaid.*

WANTED—300 drops or less, second hand American Express Metallic Circuit Drop. Address DROP, care AMERICAN TELEPHONE JOURNAL, 1263 Monadnock Block, Chicago.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

POSITION as superintendent or manager of telephone company. Eight years' experience in managing and building exchanges and toll lines. At present superintendent of construction, large Independent company. Best of references. Will be open for position after April 1st. Address Lock BOX 11, RECTOR, ARKANSAS.

POSITION as wire chief in exchange of from 500 to 1,500 telephones, or as manager of small exchange. Five years' experience and best of references. Address J. H. W., care of the AMERICAN TELEPHONE JOURNAL.

WIRE chief, formerly in charge Bell exchange, 3,000 lines, New York, wants position as manager of 500 to 1,000 subscriber exchange. References. Address E. F. L., care THE AMERICAN TELEPHONE JOURNAL, N. Y.

POSITION as manager and engineer in exchange of 2,000 lines or less. Formerly wire chief in Bell exchange, N. Y., 3,600 lines. Address H. J. S., care AMERICAN TELEPHONE JOURNAL, N. Y.

AN ASSISTANT MANAGER from a large New York City (Bell) Exchange and competent Traffic Manager desires position away from New York City as manager or superintendent. Address "EX-BELL," care AMERICAN TELEPHONE JOURNAL, New York.

WANTED, position as manager or assistant of an exchange of 200 to 500 subscribers. Several years' experience; can give good references. Address J. E. THURSTON, North Vernon, Indiana.

POSITION by an all-round telephone man, as manager of small exchange or as inspector or troubleman. At present with Bell company. Address W. M. G., care AMERICAN TELEPHONE JOURNAL.

The American Telephone Journal

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TELEPHONE SERVICE ON THE SEA ISLANDS OFF THE COAST OF SOUTH CAROLINA

By Reginald F. Fennell, General Manager Gordon Telephone Co. of Charleston, S. C.

THERE has recently been inaugurated a modern telephone service on the islands where the famous long staple cotton is grown—that is, the islands of Edisto, James, Wadmalaw, Johns and Youngs, off the coast of South Carolina.

These islands and the adjacent mainland, also connected with the telephone system, furnish a notable proportion of early fruit and vegetables for Northern markets, the shipments amounting to nearly three-quarters of a million dollars annually.

Prior to the telephone service, the cotton planters and farmers had to send many miles for information as to market quotations. Now they receive reports as quickly as in a city.

Reports are also sent over the lines from the Weather Bureau Office in Charleston to various points, furnishing information as to the weather conditions.

The lines are operated on a thorough business toll line basis, as shown by the accompanying forms, devised by the Gordon Telephone Company, which operates and controls the system. The form marked "Inward" is used for all connections originating on lines terminating in another exchange than the one making out the form. The form marked "Outward" is filled out when the connection originates at a station connected with the exchange making out the form, but terminates at a station of another toll line exchange. The "Intermediate" form is used for all connections which originate and terminate at points both of which are located on, and connected with, the exchange making out the form. By the use of these forms business coming through two exchanges has a double check, because should one exchange omit to make out the records for a connection, the records from the other exchange show the entire transaction. All forms are made out at the toll line exchanges where business sent over the lines is checked and reports forwarded to the auditing department.

The Gordon Telephone Company,

(INCORPORATED)

No..................................

INWARD.

.... Date ....190..

Time Connected .... Time Disconnected ......

From ....

Who talking..........................

To ....

Who talking..........................

This Line Tolls $....Total.

Mes. Service.........at ....

Telegrams............Via ....

Other Line Tolls....Via ....

Sundries ....Due ....

Total

Charges O. K.'d by....................

....

Toll Operator.

(This form printed on pink paper.)

The Gordon Telephone Company,

(INCORPORATED)

No..................................

OUTWARD.

.... Date ....190..

Time Connected ...... Time Disconnected ......

From ....

Who talking..........................

To ....

Who talking..........................

This Line Tolls $....Total.

Mes. Service........at ....

Telegrams........ Via ....

Other Line Tolls.....Via ....

Sundries ....Due ....

Total

Charges O. K.'d by....................

....

Toll Operator.

(This form printed on yellow paper.)

The Gordon Telephone Company,

(INCORPORATED)

No..................................

INTERMEDIATE.

.... Date ....190..

Time Connected ...... Time Disconnected ......

From ....

Who talking..........................

To ....

Who talking..........................

This Line Tolls $ ....Total.

Mes. Service ....at ....

Telegrams.........Via ....

Other Line Tolls.....Via ....

Sundries ....Due ....

Total

Charges O. K.'d by....................

....

Toll Operator.

(This form printed on white paper.)

Located at a central point is an exchange, over which day and night service is given with stations located at various points. Between this exchange and the system of The Gordon Telephone Company at Charleston, S. C., there is a copper trunk connection.

For stations to obtain connections, it is necessary for them to call "Central," through which all switching is done and connections made. This also applies to stations located on the same circuit, as the stations are so arranged that two stations on the same circuit cannot call each other unless the connection is made by the operator.

The basis of estimating rates for service is that of 1 cent per mile for distances up to 25 miles, with no charge less than 10 cents. All distances over 25 miles are rated at ¾ cent per mile, with no charge less than 25 cents. Distance is based on the number of poles between stations for which the rate is compiled and is not on a distance of wire circuits over which the conversation is sent. An additional charge of 1 cent per 1,000 feet is charged for submarine cable, and ½ cent per 1,000 feet for marsh cable—in order to make the minimum charge of 10 or 25 cents referred to.

All connections are timed and are on a three-minute basis, care being taken to see that correct charges are collected.

A system of toll line tickets is used, which are issued in denominations of 5 cents, 10 cents, 15 cents, 25 cents, 50 cents and $1, printed in various colors to enable their being easily distinguished. These tickets are good in payment of toll line service, and are sold in quantity lots at a discount. This method is found satisfactory, as it is an easy means of making remittances and tends to increase the business, as parties holding tickets are more apt to talk than when cash is paid. This also guarantees the payment of accounts. Toll line bills are sent out by the auditing department at the beginning of each month for the one preceding, and are payable at once.

The plant was constructed by the Island Telephone Company, the officers of which are: Reginald F. Fennell, of Charleston, S. C., president and treasurer; Cecil G. Fennell, of Val Verde, Arizona, vice-president; M. C. Duncan, of Charleston, S. C., secretary. Many of the people on the islands and adjacent mainland are financially interested as bondholders.

The construction has been expensive, owing to the country through which the lines pass. In some parts the undergrowth is heavy, of a semi-tropical nature, and on the edge of the islands there is a large amount of marsh land.

The connection between the islands and the mainland requires a submarine cable over 1,000 feet in length.

Through marshlands, lead cables have been used with success, and experience has shown them to be superior to pole lines for this class of construction.

Connections between some stations are over 8,000 feet of submarine cable and 11,000 feet of lead cable.

There are two submarine cables of over 4,000 feet in length of five metallic circuits each, and at one point a marsh and submarine cable extends for a distance of nearly three miles.

Owing to so large an amount of cable, the transmission would seem to be poor, but this has been obviated by the almost entire use of paper insulated submarine cables, making the service first-class in every respect and securing clear transmission.

To protect against the heavy electrical storms experienced at some seasons, all apparatus is equipped with the best protection obtainable. In one instance lightning struck the main trunk lines, melting the copper.

In building the system the best grade of construction was used, the instruments being especially wired and the switchboards made to special specifications. The poles are of black cypress, with 8-inch to 12-inch tops. Poles are set 130 feet apart except on curves, where they are drawn in to suit conditions. The cross-arms are standard size, bored for six 1½-inch pins, and are 4¼ x 3¼ x 6 feet, and bored for one ⅝-inch bolt in the center of the side of the arm and two ⅜-inch bolts 21 inches from the center of the side of the cross-arm each way and painted with red paint. These cross-arms are bolted to the poles with one ⅝-inch machine bolt, with a square washer under the head and nut, and are supported by standard braces. The pins used are locust, 1½ inches in diameter by 9 inches long over all. Guys are held by anchors placed 5 feet to 6 feet in the ground and attached to 5-foot logs. The lines are laid out on the basis of straight lines, each curve being thoroughly guyed. Metallic circuits have been used throughout.

The system is to be extended to the rice fields on the mainland, and as telephonic communication is now obtainable from the stations to points where long staple cotton, tobacco and early vegetables of almost all kinds are raised, the system will cover a representative portion of this part of the Southeast.

THE IMPORTANCE OF THE OUTSIDE PLANT*

By G. C. Allen.

THE central office apparatus may be considered as the cerebral headquarters of a telephone system; it is the brains of the working plant. But as the brain, without nerves extending to all parts of the body, would be unable to perform its function, so would a telephone central office be without purpose unless there were leading from it to all parts of the district served, suitable conductors co-operating with the organization represented at the central office.

With the magneto system there was upon the lines no normal current. The only current which these lines had to carry was the occasional ringing current employed when signalling a subscriber and the minute telephone current impressed upon the line during conversation. Neither of these currents imposed upon the conductor or its dielectric any substantial strain. With the common battery system, however, there is upon the line at all times an electro-motive force of 24 volts and during conversation there is a current flowing, although in small amount. The strain put upon the dielectric of the conductor by such a small voltage as that employed is not in any sense to be compared with that encountered in electric light practice, but considering the large number of wires which must be placed in one cable and considering the small amount of insulating material with which it is practicable to enclose the conductors, the strain is by no means negligible and as compared with former conditions, it is most substantial. Perhaps in employing the word "strain,"I am conveying an erroneous idea, but when we consider the presence of a very small voltage upon the line for a long period of time, possibilities of destructive effects in the dielectric are present to a considerable degree. For this reason, an unusual amount of care is required in the maintenance of cables connected with common battery systems.

Paper has been universally accepted as being for telephone conductors the best insulating medium, both on account of its low inductive capacity as well as its high insulating qualities. Even small amounts of moisture, which might in chemical language be referred to as "traces" will produce a lowering of the insulation which is not tolerable in the best practice. For this reason, the method of laying and maintaining cable has become more and more rigorous as our experience with this new switchboard system has progressed.

Periodical insulation tests are made and incipient faults are immediately noted and steps at once taken for their rectification. It is now a matter of every-day practice, by means of electrical measurements, to locate within a few feet faults in cables, whether due to the discontinuity of the conductors or to a failure of insulation.

With the advances of central office construction and with the enormous increase in conductors in such cities as New York, has come a greater extension of underground wires. At present a larger percentage in mileage of the conductors on Manhattan Island is underground than may be found in cities elsewhere. On Manhattan Island there are now installed 222,543 miles of telephone conductors. Of this vast mileage of wire, 98.08 per cent. is wholly underground. Substantially all of these wires are paper insulated and covered with lead pipes. Exposure to the air, due to a perforation of the lead pipe, even so small as a pin-head, would result in the ultimate failure of the cable.

To give an idea of the magnitude of the task of maintaining all of these wires in lead pipes which shall be practically hermetically sealed, I may state that the total area of the lead covering required to enclose these 222,440 miles of conductors amounts to more than fifty acres. Had it been known at the inception of the telephone that the full working out of the idea of Prof. Bell would require the maintenance of such conditions, it is safe to say that at that time no one could have been found who would give countenance to such a foolhardy project.

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*Abstract of discussion, 172d meeting American Institute of Electrical Engineers, New York, January 23, 1903.

SOME STEPS IN THE EVOLUTION OF CIRCUIT DESIGN—ARTICLE X—INTRODUCTORY TO COMMON BATTERY, OR CENTRAL ENERGY SYSTEMS

BY J. C. KELSEY.

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IN the early days of electric lighting, small machines, in many isolated plants, furnished light to the many districts of a large city. A local battery telephone system may be likened to a city lighting plant, with a steam engine and dynamo for every light, while a common battery telephone system resembles a modern power plant, with one huge generator furnishing power to all the stations.

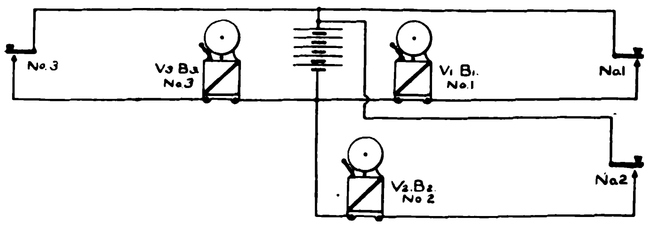

FIG. 64.

Many houses have a common battery system, not of telephones, but of push buttons and bells, or annunciators. One station, or push button, may be at the front door, another in the dining room under madam's foot, and others in various rooms, but all use the same battery, and have annunciators mounted in a panel in plain sight of the housemaids. A common battery telephone system has talking instruments instead of push buttons, lamps instead of annunciators, mounted in switchboard panels in plain sight of operators, and a large storage battery, instead of the small primary battery. The housemaid restores the annunciator signals mechanically, and answers the call personally, while the operator answers by telephone, and her signals are restored automatically. The act of taking the receiver off the hook resembles pressing the button.

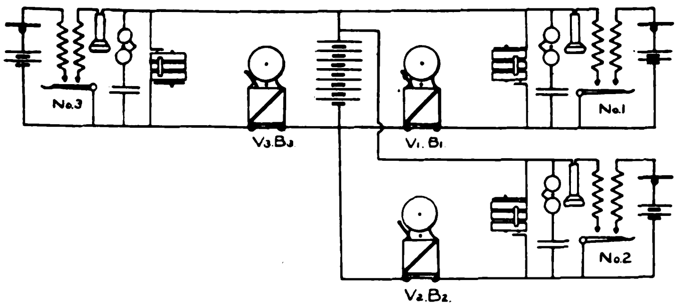

FIG. 65.

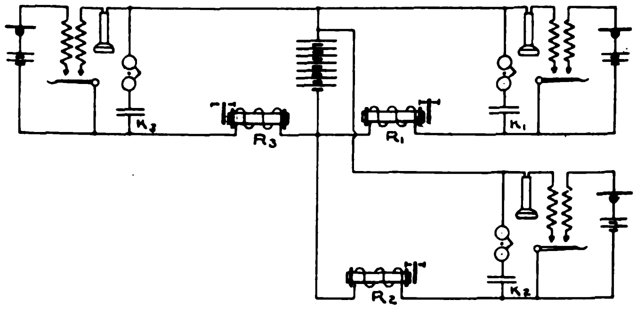

FIG. 66.

To show the development of a common battery calling circuit, take a three station push button and vibrating bell system, as shown in Fig. 64. Consider the station No. 1 as composed of a push button in the President's office, and the vibrating bell, V^1 B^1, mounted over the office boy's desk. Also station No. 2, or push button No. 2 in the General Manager's office, and station No. 3, or push button No. 3 in the Superintendent's office, with their respective bells, V^2 B^2 and V^3 B^3, mounted also over the office boy's desk. Consider battery B as under the desk.

If the President wants the Superintendent, he presses the button, which calls the office boy, who then calls the Superintendent. Such a method is slow, so it is desired to put in a small telephone system, using the office boy as operator.

The first step is to replace the push buttons with telephones, and assume the local battery telephone is the only one at hand. Such a telephone has a closed circuit through the bridging bell, which would cause the bells to ring permanently. So according to Fig. 65 condensers must be placed in the bell circuit, as shown by K^1, K^2 and K^3. By removing the handle from the ringing generator, we improvised a telephone until common battery instruments are obtained.

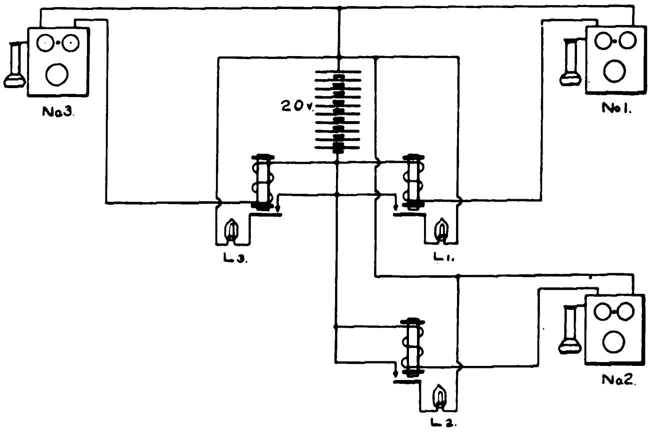

FIG. 67.

But when the telephone is off the hook the vibrating bell will ring continuously. So it is desirable to exchange the bells for a visual signal. Such a device may be realized by a telegraph relay. In such a circuit, the telephone could send a telegraphic message by using the telephone hook as a telegraph key. But we desire to keep the relay out of sight, or mounted under the desk, so that a circuit as shown in Fig. 66 is employed.

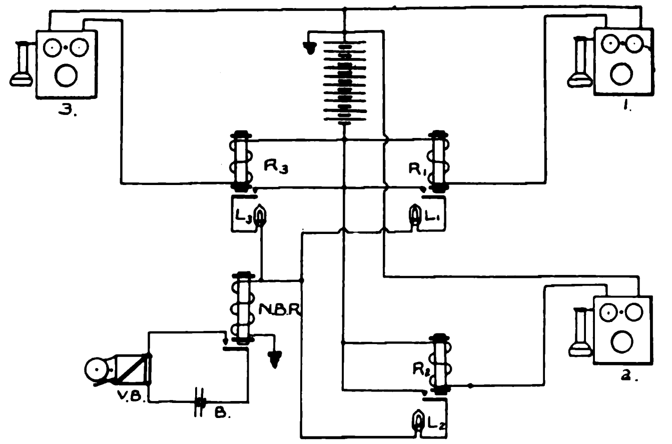

FIG. 68.

Lamp signals may be used and by making them depend upon the relays, R^1, R^2 and R^3, the closing of the contacts of which completes circuit through the battery and a lamp of proper pressure for the battery, which may be assumed to be twenty volts, as

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EDITOR'S NOTE.—The first article of this series appeared in the issue of Nov. 29. They will continue for many months.

shown in Fig. 67 the act of taking the telephone off the hook will light the respective lamp, as station No. 1 lights lamp L^1. To insure that the operator shall observe the signal an additional circuit is shown in Fig. 68, which should be particularly observed, as it is the basis of the common night bell signal. Through NBR, the night bell relay, all current passes to the lamps. If any lamp is lighted, it takes enough current to magnetize this relay, so when any lamp lights, the night bell relay is pulled up, and sounds a vibrating bell from a separate battery, which calls the operator's attention.

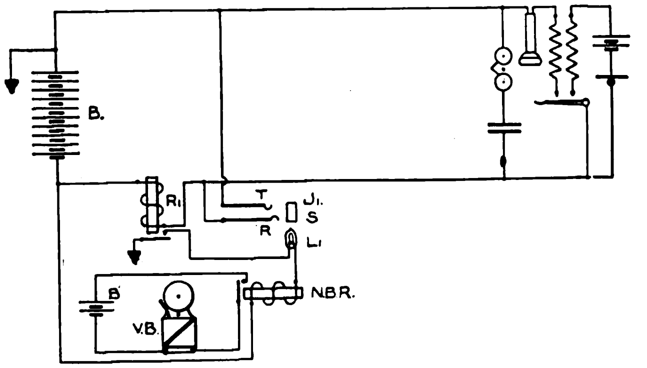

FIG. 69.

Fig. 69 shows one line, with the relay, R^1, and night bell relay, NBR. The party taking the telephone off the hook, energizes R^1, lights L^1, causes NBR to close its contacts through VB, the vibrating bell. But means must be provided the operator to talk to the parties calling. Therefore the jack, J, is connected to the line, tip T, to the positive side, ring R to the negative side, and the sleeve S, open, between the relay, and the telephone. We may also assume that the positive terminal of the battery is earthed, so that in our drawing, any connection shown as earthed, as L^1, really means that it is connected to the positive terminal. Convenience in drawing also demands that several batteries be shown, but all of which are the same battery, if the grounded connection is shown.

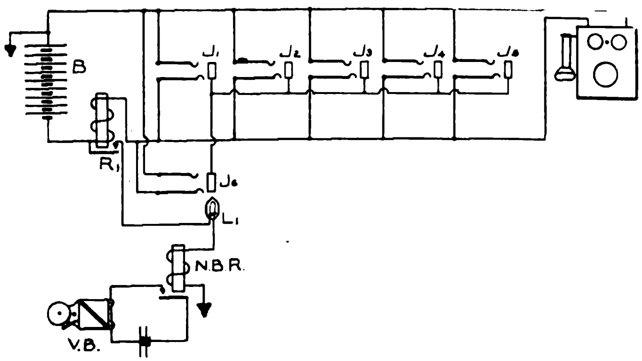

FIG. 70.

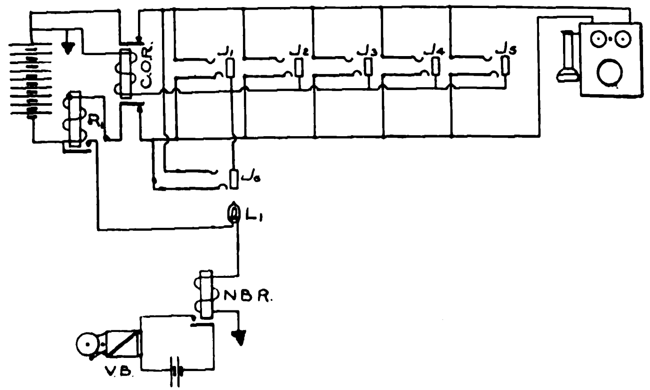

FIG. 71.

If instead of three stations, we consider from now on, one of not less than one thousand, the multiple board will be composed of five sections, and each operator will have the entire thousand lines, terminating in jacks, within her reach, which may be represented as in Fig. 70, where J^1, J^2, J^3, J^4 and J^5 are the multiple jacks, and J^6 the answering jack, directly underneath the lamp L^1. The sleeves are connected in multiple, for reasons soon to be explained.

In the local battery service, on multiple boards, to keep the drop from falling, when a multiple operator rings on the line, the jacks are made, so that the entrance of the plug cuts off the signal apparatus, and left the operator in direct connection with the subscriber. If in common battery service, when the multiple operator called a party, and he answered, the lamp would light up in front of the answering operator, and she would plug in, only to find that some one else was using the line, making much confusion. It becomes imperative that the entrance of the plug shall cut off the line battery and relay, and reintroduce battery to the subscriber through the cord circuit. This must be done electrically by the presence of battery on the sleeve, which shall flow through a cut-off relay, from the sleeve of the jack. This act opens the line between the relay and the first jack, as shown in Fig. 71, COR, being the cut-off relay, actuated by the entrance of any plug.

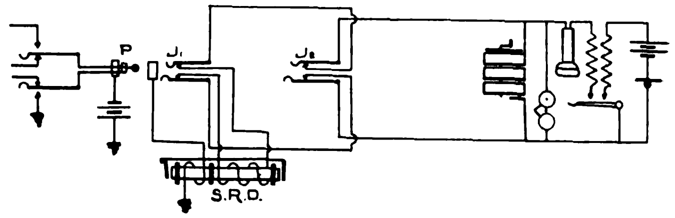

FIG. 72.

Here it is well to trace the relation of the restoring drop system. In Fig. 72 is shown the drop, SHD, J, the cut-off jack, and P, the plug, with battery on the sleeve. The act of plugging in cuts off the drop mechanically and at the same time the battery flows from the plug sleeve to the jack sleeve, thence to the restoring winding. In Fig. 73, the effect of a plug is shown. The cut-off relay, COR, is open, thereby cutting off the path of the current which had been flowing to the subscribers' instrument, consequently, the relay R releases its contacts, the lamp is extinguished, and can in no way be lighted, as long as a plug is in the jack. Instead of a restoring winding, and the consequent flapping of the drop shutter, and the mechanical action of cutting off the drop, we have a clean combination of electrical action, silently cutting off the line relay, and extinguishing the lamp, without wear, tear, and danger of open multiples.

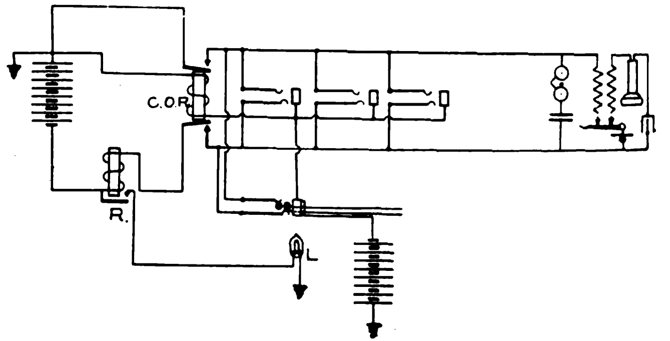

FIG. 73.

IOWA ASSOCIATION CONVENTION

THE seventh annual meeting of the Iowa Association will be held in the club rooms of the Savery House at Des Moines, on Tuesday and Wednesday, March 10 and 11, 1903. The convention will be called to order Tuesday afternoon at 2 o'clock.

Iowa telephone men have signified their intention of attending this convention almost to a man and nearly every company in the State will be represented. Several matters of importance will be discussed including the all-important question of toll facilities and interchange of business. Manufacturers and supply men will also be much in evidence. The program committee is now working on a program and will provide an interesting and instructive list of subjects and speakers.

The officers of the Iowa Association are U. S. Alderman, president; Henry S. Herr, vice-president; Charles C. Deering, secretary and treasurer; executive committee, Charles Kirk, Chariton; George N. Bandy, Perry; J. S. Bellamy, Knoxville, and H. C. Raney, Fairfield.

SOME POINTS ON MAGNETO GENERATORS*

By Chas. W. Farr.

THE little machine, termed in telephonic parlance a "*generator*," is in reality a small dynamo. Generators can be constructed to produce either alternating or direct currents, but in telephony the use of these machines is almost exclusively confined to the production of alternating currents for ringing. The principle of the dynamo was discovered by Faraday in 1831, and about a year later Hippolyte Pixii produced the first machine for this purpose, which consisted of a powerful steel horseshoe magnet, between the poles of which an armature, containing a coil of wire, was revolved.

Telephone generators are used either on series lines or upon bridging lines, and practical experience shows it to be desirable to construct different machines for each of these classes of work. Ringing generators, to be used in connection with 80 ohm bells should be wound to give a high electromotive force, necessary to overcome the resistance of the many stations placed in series. A good machine for this purpose is a five bar 50,000 ohm generator, with its armature wound with No. 35 silk covered wire to a resistance of 550 ohms. A series machine, properly constructed, should supply current at 90 volts and give .1 of an ampere, yielding an output of 9 watts. Generators are usually rated by the amount of resistance through which it is possible for them to ring their own bells; thus, if one speaks of a 25,000 ohm, or a 50,000 ohm generator, it means that the machine will ring its own bell through the resistances specified.

Generators to be used upon bridging systems, should be proportioned to give a greater quantity of current than those for series lines. Sufficient pressure must always be supplied, for in many instances such instruments are placed on long iron grounded lines, heavily loaded with poor connections and the generators must supply the needed electromotive force to overcome all of this opposition. But, in addition, it must not be forgotten that bridging lines, owing to the number of instruments placed across them, will consume a large amount of current, thus rendering a generator of greater capacity essential. A good machine for bridging line work is a 50,000 ohm generator, with five bar magnets, and an armature wound with No. 33 wire to 350 ohms.

In some cases six bar 100,000 ohm bridging generators are desirable. Such machines should produce an electromotive force of 120 volts, and .26 amperes, or a little over 31 watts.

The important points in the manufacture of generators are embraced in skilful workmanship, careful selection of the magnet steel, and other materials, and the proper treatment of the steel to produce the best magnetic effects. If the steel is of an inferior quality, the magnets soon lose the charge imparted to them and the generators fail. Experience has shown that steels containing a very small proportion of sulphur and phosphorus, and a higher proportion of carbon, silicon and manganese, are desirable, and by combining the analyses of many samples with experience in practice of making generator magnets, it is possible to prophesy as to the desired chemical constituents of the steel required.

Magnets are best hardened by being heated to a cherry red, then plunged into the proper cooling fluid. For this purpose mercury produces the hardest magnets, brine stands next, soft water succeeds, with oil at the bottom of the list. To secure the best results, magnets should be heated as quickly as possible, with great pains to prevent any overheating.

Magnetization is usually accomplished by drawing the hardened bar several times over a powerful electromagnet, furnished with large pole pieces. Generator magnets are bent into the horse-shoe form because this shape, by bringing the poles in close proximity to each other, produces the strongest magnetic field in which armature may be placed.

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*Paper read at the recent meeting of the Independent Telephone Association of Wisconsin.

CONVENTION OF THE KANSAS ASSOCIATION

THE semi-annual meeting of the Kansas Independent Telephone Association was held in Topeka, Kansas, at the Hotel Throop, January 28 and 29. The principal object of this meeting was to secure adequate toll facilities for the many Independent exchanges in Kansas. Arrangements were made for toll connections with Kansas City by the signing of a contract with the Western Telephone Company of Kansas City in which the latter guarantees to connect Topeka and Kansas City by telephone within the next four months. It will also connect Topeka and Wichita, and Topeka and the Northwest of Kansas in five and six months, respectively. It guarantees to forfeit twenty-five dollars for every day over that time. The Kansas Independent telephone companies will also be connected by trunk lines with several of the larger towns east of the Missouri River including St. Louis.

As this meeting was of vital interest to every one of the Independent companies in the State, practically all of them were represented. There were about 150 delegates present, but this number gives no idea of the number of exchanges represented as, in many cases, one delegate represented a number of companies. Manufacturers and supply dealers were also much in evidence and several very elaborate exhibits were set up in the Throop House.

Just before the convention was called to order on Wednesday afternoon, the members of the executive committee and the officers of the association gave a reception to the delegates. Practically the remainder of the afternoon was devoted to conferences and the examination of the various exhibits. At 7.30 in the evening the convention assembled and after organizing, several committees were appointed. General business was then discussed and unfinished business disposed of.

Thursday morning at 9.30 reports of the committees were heard after which W. C. Polk read a paper on "The Engineers of the Kansas City Exchange."

M. L. Robeson, of Galena, read a paper on "Progress in Southeastern Kansas."

Thursday at 2 p. m., the following officers were elected: A. A. Godard, of Topeka, president; J. M. Doyle, of Belleville, vice-president; Charles E. Wells, Marion, secretary, and J. W. Smith, of Minneapolis, treasurer. Mr. Wells and Mr. Smith held office during the past year and were re-elected. The new executive committee is composed of C. H. Munsell, Hiawatha; J. E. Byers, of Ottawa; W. H. Nelson, Smith Center, and A. H. Champlin, Newton.

Mr. Godard, who was elected president, is the ex-attorney-general of Kansas and a prominent citizen of Topeka. He has been a director of the Independent telephone company of Topeka since it was organized, a little over a year ago.

After the installation of the officers, Charles E. Wells read a paper "Hic Jacet Berliner." "Our Needs as I See Them" was read by W. H. Nelson, of Smith Center.

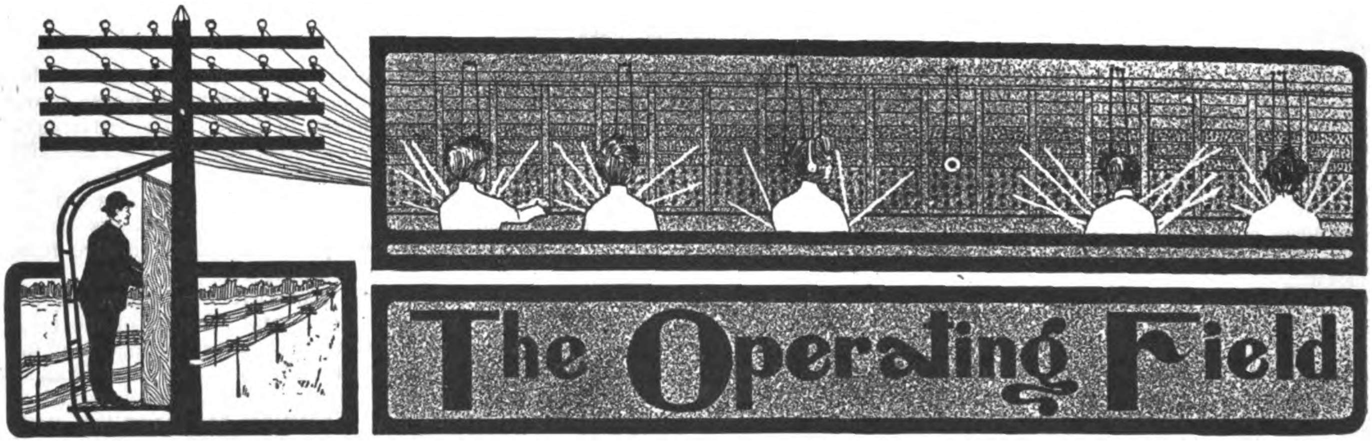
After a discussion of these papers and the consummation of unfinished business, the convention adjourned.

Among the manufacturing firms represented were the American Electric Telephone Company, Chicago; Central Telephone and Electric Company, St. Louis; Kansas City Telephone Manufacturing Company, Kansas City; Kellogg Switchboard & Supply Company, Chicago; John A. Roeblings' Sons Company, Trenton, N. J. Stromberg-Carlson Telephone Manufacturing Company, Chicago and the Swedish-American Telephone Company, Chicago.

A place was not selected for the holding of the next meeting which will be held within the next six months.

FINANCIAL OUTLOOK BRIGHT

IT is practically assured that the plan to refinance the Cuyahoga Telephone Company by the sale of preferred stock to the stockholders at 60 will go through. Many subscriptions to the stock have already been received and it requires but a few more to assure the success of the plan and the placing of the property upon its feet as one of the best Independent telephone properties in the United States.



PLANS TO ENTER MILWAUKEE.

C. C. RUSSELL, one of the organizers of the Badger Telegraph and Telephone Company, in a recent newspaper interview told of the plans of the new company.

"We propose first to enter the city, if possible, said Mr. Russell, and install a few booths, giving the patrons an opportunity to converse, if they so desire, with the subscribers of the Independent lines. The company will have lines in Rock, Green, Walworthy, Dane and La Fayette counties, aggregating about 400 miles of toll lines. In the territory to be covered we will have about seven telephones to the Bell company's one, or in more specific numbers about 7,300 telephones to 1,500 on the Wisconsin company's lines. In Racine alone we will have 1,500 telephones, while the Wisconsin company has about five.

"There may be some trouble in getting a franchise to extend our lines into Milwaukee. The council may not desire to grant us the rights when we apply for them. I think, however, that we will eventually be able to enter the city, as it is not possible for the city authorities to shut us out entirely. It will be necessary for us to build conduits to extend our lines into this city.

"While it is not yet a certainty, it is highly probable that almost all of the other Independent telephone lines of the state will unite with us if we are able to build a line into Milwaukee. The companies of the north, the Little Wolf River and other companies, will probably come in over our lines. This will give Independent company lines to almost all parts of the state. In any of these sections which the toll lines will reach it will be found that the Independent companies have six or seven telephones to the Bell company's one.

"We do not propose at once to endeavor to open an exchange in Milwaukee, though I have no doubt but that such an exchange, Independent of the Bell company, will be opened before long, if we succeed in getting our toll lines into the city. There are plenty of men who are willing to put in money in such an enterprise, and I have no doubt but that in time the move will be successfully made."

The Badger Telegraph and Telephone Company will own all of the holdings of the Badger State Long Distance Telephone Company. Mr. Russell states that among those who may interest themselves in the new enterprise are Richard Valentine of Janesville, H. A. J. Upham, John K. Fish and others.

LOUISVILLE HOME SCORES A VICTORY.

THE Kentucky Court of Appeals has affirmed the judgment of the Jefferson Chancery Court in the case of the Cumberland Telephone and Telegraph Company against the Louisville Home Telephone Company.

The action grew out of a wrangle between the companies over the building of telephone lines along Frankfort avenue in the city of Louisville. The appellee company began the construction of a line along this street and appellant erected a line blocking it. Appellant instituted action to restrain the Cumberland Company from interfering with it and to require it to cut off its poles and make its line in the plane ten feet below it. The Chancellor adjudged the Home Company the relief it sought.

On the appeal of the case to the courts at Frankfort, Ky., the Cumberland Company attacked the home corporation, which is in Delaware, and contended that it should not be recognized by the Kentucky courts to sue. In disposing of this contention the court here says:

"It appears from the record that appellee has spent something like a half million of dollars in the construction of its system. It has been a policy of the State to invite foreign capital here to aid us in the development of the resources of the State. This corporation has come here under that policy, and in the absence of some express legislation we are not at liberty to shut the doors of the court against it when suing 'for the protection of valuable rights granted it by the municipality pursuant to the laws of the State.'"

"On the merits of the case we have little difficulty," says the court. "Appellant's franchise was not exclusive; its prior occupation of a particular space entitled it to the continued enjoyment of that space without substantial impairment by appellee, but this enjoyment is subject to such incidents as result from the exercise of the rights of appellee under its franchise, for it is necessarily implied in the grant to appellee that it is subject to such limitations as will enable another to enjoy a like franchise."

THE MICHIGAN ASSOCIATION.

THE Michigan Independent Telephone Association held its annual convention at the Hudson House in Lansing, Mich., on Thursday, of this week. The meeting was called to order at 10:30 A. M. by president J. B. Ware, of Detroit. After the president's address, Thomas Bromley, of Muncie, Ind., read a paper "Indiana Independent Situation." At its conclusion R. F. Johnson, of Saginaw, read a paper on the "Clearing House." This paper was discussed by E. B. Fisher, of Grand Rapids, and J. H. Fildew, of Alma, Mich.

"Night Rate and Three Minute Service," was the subject of a paper by C. E. Tarte, of Grand Rapids. This paper was discussed by H H. Robinson, of Cleveland, Ohio. Stanley Parkhill, of Owosso, Mich., read a paper on the "Necessity of Independent Connection to Detroit Business Men," which was discussed by R. B. McPherson, of Howell, Mich. H. E. Adams, of Toledo, Ohio, contributed a paper on the "Toledo Exchange" and W. A. Hunt, of Adrian, Mich., read a paper on "Rural Telephone Connections," which was discussed by H. A. Douglas, of Jackson, Mich. Officers were then elected for the ensuing year.

A full account of the proceedings and the papers and discussions will be printed in THE AMERICAN TELEPHONE JOURNAL for March 7.

COURT DECISION BENEFITS DES MOINES MUTUAL.

THE decision of the Supreme Court of Iowa handed down this month that a telephone company needs no franchise to occupy the streets of a city, will, it is said, greatly benefit the Mutual Telephone Company, of Des Moines. Under the franchise granted to the Mutual Company it was supposed to pay into the city treasury 5 per cent. of its gross earnings.

The law under which telephone companies are held by the court to have the right to do business in the streets of the city without a franchise was passed in 1873. The next legislative enactment was in 1888. This latter merely provided that the cities might "regulate" telephone companies. The Mutual Company was organized in 1895. The franchise issued to it, was entered into in 1896. In 1897, at the time the code was revised, the telephone legislation was placed on an entirely different basis. Cities were given the power to "authorize" as well as "regulate" telephone companies and lines, and provisions were enacted with respect to the method of granting franchises.

It is understood the Mutual Company will not deny the right of the city to "regulate" its lines. This regulation includes such matters as requiring wires to go underground, the placing of poles, the painting of poles, etc.

But the vital parts of the Mutual franchise which are claimed to be abrogated by the Supreme Court's decision are those requiring the company to charge not to exceed a certain rental, and requiring it to pay 5 per cent. of its income to the city.

The Mutual Company now owes the city about $12,000. Before the Supreme Court decision there was much talk by the city authorities to bring suit to collect this amount but the Mutual Company now holds that under the Supreme Court's decision a suit would be fruitless.

Of course, under this decision, the Iowa (Bell) Telephone Company is also permitted to do business in the city without a franchise. In speaking of the decision a director of the Mutual Company recently said:

"The decision is a good thing for the Mutual Telephone Company. We had hoped that it would be the other way for that would have done away with our competition altogether. But while the Iowa Company is gaining something we also gain a great deal."

TOLEDO HOME FINANCIALLY STRONG.

A RECENT financial statement issued by the Toledo Home Telephone Company shows that the common stock is now earning on a basis of greater than 5 per cent. and a marked advance in the market value of the common stock is expected soon. A movement is now on foot to form a voting trust to control the company insuring that it will remain permanently in the hands of the Independents. The voting rights of a majority of the stock will be pooled for five years soon, and it is expected that strong interests will then take hold of the stock and push it up.

The *Toledo Courier* referring to a meeting of the Board of Directors recently says: "Considerable surprise was expressed when the financial report submitted by the chairman, Mr. M. V. Barbour, showed that the net earnings on the stock was 4⅜ per cent. for December and 5¼ per cent. for January. If it can be demonstrated that the plant is capable of earning this amount there is no reason why this stock should not go nearly to par. The showing is as good as that made by the Citizens Telephone Company, of Columbus, and the stock of that company is selling at 80 or better. Some of the wise ones are of the opinion that the present bear movement has been the result of carefully laid plans whereby some of those on the inside desire to get control of the stock."

LEGAL OPINION ON CUYAHOGA RIGHTS.

THE following is the opinion of Squire, Sanders & Dempsey to President Dickson, of the Cuyahoga Telephone Company, on the right of the latter company to raise its rates and compel the city to pay for telephone service.

The ordinance fixing the terms and conditions of occupancy by The Home Telephone Company of the streets of the city, passed in February, 1896, and which we assume was accepted by that company, in addition to prescribing the mode of use of the streets, contains sundry other stipulations, among others a stipulation which in the ordinance is recited to be a condition of the grant—that the price of rental charged by the telephone company and its successors and assigns shall in no case exceed certain amounts specified in the ordinance. Another section requires the Home Telephone Company or its successors or assigns to furnish, free of cost to the city, a certain designated number of instruments. The question which you submit we understand to be—whether, in our judgment, these two provisions are binding upon your company in so far as you are operating under said ordinance and as assignee of the Home Company.

The statues originally passed applicable to telegraph companies have been made applicable to telephone companies, and, under section 3435 it is provided that telegraph companies may construct telegraph lines from point to point along any public road by the erection of the necessary fixtures, but the same shall not incommode the public in the use of such road. The power conferred by this section, it will be observed, is broad in its terms, and, except so far as limited by other provisions of the statutes, would operate as a direct grant from the state to the telephone company to occupy any public road for the purpose of operating its lines. Other provisions of the statue, however, fix certain limitations, and among others, is a limitation found in section 3461. The substance of this section is—that when the land authorized to be appropriated to the use of the company is subject to the easement of a street within the limits of any city or village, "the mode of use shall be such as shall be agreed upon between the municipal authorities of the city or village and the company."

Except so far as the city of Cleveland was given power to contract with telephone companies as to the use of the streets in the section from which we have just quoted, it was, in 1896, at the time that the ordinance relating to The Home Telephone Company was passed, absolutely without power; that is to say, it had no power whatever to control the right of the telephone company to use the streets of the city except the right which is conferred upon it in section 3461. This section, as it has been construed by the Supreme Court of this state and by certain of the inferior courts, has been held to mean—that the city is clothed with authority to make agreement with the telephone company as to the "mode of use." It is very plain that authority to contract as to the mode of use is not an authority to impose terms and conditions upon the telephone company as to the rentals to be charged or to exact from the telephone company any form of compensation for the use of the streets. The right of the telephone company to use the streets of the city of Cleveland is derived directly by grant from the legislature, nor can the city prevent the use of its streets by a telephone company. This being the statute law upon the subject, it is plain, in our judgment, that the city of Cleveland was without authority to contract with reference to the prices to be charged for telephone service, and without authority to contract for free telephone service from the Home Company as is done in the ordinance under discussion.

NEW NEBRASKA ASSOCIATION.

REPRESENTATIVES of the Independent telephone companies operating lines in the vicinity of Nebraska City, Nebraska, met recently in that city. Delegates were present from several Nebraska companies, including Papillion, Plattsmouth, Nebraska City, Auburn, Stella, Falls City, Beatrice and other places in Nebraska, as well as one company from southwestern Iowa, and two from northwestern Missouri. An association was formed for the purpose of adjusting tariff rates and properly dividing the receipts among the several companies, and is to be known as the Southeastern Nebraska Telephone Association. The following officers were elected: President, A. E. Gantt, Falls City; vice-president, T. H. Pollock, Plattsmouth; secretary, A. M. Munn, Nebraska City; directors, J. C. Killarney, Auburn, and C. H. Thomas, Stella.

Kansas City, Topeka, Omaha and a suburb of Lincoln can now be reached over the Independent lines.

SUCCESSFUL KANSAS COMPETITION.

THE count officials of Shawnee county, Kansas, and the city officials of Topeka, Kan., have given orders to have the Bell telephones removed from their offices and replaced by Independent telephones. The Independent company of Topeka, though not over a year old, has over two hundred more telephones installed than the Bell company, which has been in operation for about twenty years.

There is as yet little promise of an agreement between the Bell company and its linemen, who have been on a strike since the first of November. A demand for an increase in wages from $2.25 to $2.50 and a decrease from ten to nine hours is made. These demands are what the Topeka Independent Company is now paying its union men.

The Independent company of Topeka has installed 150 telephones since the first of January, and a greater number for the present month is anticipated.

OPINION AND COMMENT

ENGLISH VIEW OF MONOPOLY

THE following paragraph from the London *Electrical Engineer* will interest telephone men who have given attention to the subject of government control: "Monopoly has nowhere shown itself to be so detrimental to the public good as in the telephone field, as is evidenced by the experience not only of this country, but particularly of the United States and Canada. Happily this state of things in the two last named countries has in recent years been radically changed by the expiration of the fundamental patents. The remarkable growth of Independent systems in the States is just beginning to be experienced in Canada, where the future of Independent telephony is looked on as already assured. At the present time there are 60 Independent companies carrying on operations in the Dominion, chiefly in parts of the country to which the Bell Company has been either unable or unwilling to extend its system. "Discussing the subject editorially, the *Canadian Engineer* concludes that "the ideal solution of the telephone problem in Canada is the nationalization of the service and the extinction of the Bell monoply by purchase by the Government, the control of this service being placed in the hands of a commission independent of politics and irremovable by a party. In the alternative, the extension of the local Independent companies would be welcomed, as the hope of getting any effective control of the Bell rates is not entertained. Looking at the progress in the States it is seen how the business has been developed in the past five years by the Independent companies. More Independent exchanges have been established and more telephones put into use during that period than were used during the 20 years previous that the Bell Company held a monopoly of the field. The effect of the competition of these companies has been to bring the rates down to a legitimate basis and to give a first-class service."

"Looking at the progress in the States," as the *Canadian Engineer* says and looking at the lack of progress in most other countries where the telephone is under Government control it is astonishing that the *Canadian Engineer* should advocate Government control of the telephones in Canada. Government control has been and will continue to be one of the principal obstacles to telephone development and efficiency in the greater part of the world. Government control of telephony generally means either business or technical stagnation or both. Both the business and the engineering branches of telephony are highly technical subjects, in fact the business part of conducting a large telephone system is even more technical in its way and more highly specialized than the engineering branch. Government departments can generally command the services of highly trained engineers, but Government officials are seldom good business men, in fact it is common knowledge that they are generally very much the reverse and that Government methods of conducting business are not calculated to train good business men. It is hardly to be expected that Government officials will become, by divine inspiration as it were, efficient telephone managers. To put the telephone service of any country that has so far escaped it under Government control is to put the business back twenty years, and it is passing strange that any electrical journal should advocate such a step.

TRAIN THE PUBLIC

IN no other direction is telephonic management showing more progress at present, than in the systematic training of its operators. All the larger exchanges are establishing schools for the education of operators in all branches, some indeed instituting quite liberal courses. In a recent issue Mr. Tetu, of the Louisville Company, recites some interesting results of the working of a kind of premium system whereby the company offered a series of prizes to be awarded to the best operators, the first prize being captured by a young lady who made the phenomenal record of answering 35 calls in an average of 1 3-5 seconds per call. Mere speed is not the only qualification of good service, but the reports of an all round improvement as noticed by subscribers is flattering to this plan, and indicates that other managers would do well to try something similar. But after all is said and done the education of the operator is only the education of *one side,* and the public needs training as much or more. When a man (and often a woman also we regret to say) picks up a telephone, he acts as if he had a personal grudge against it, that was to be wiped out then and there, and seems perfectly oblivious that the operator is a woman and should receive as courteous treatment as he would accord to any one of his own women kind.

INTERNATIONAL LONG DISTANCE LINES

LONG distance telephony is making gradual headway in Europe, so far without aid from the Pupin system, as although careful experiments have been made in Germany with Pupin's method of loading the telephone circuits with inductance at stated intervals no practical application of the system has yet been made to long European telephone lines. The most recent international long distance line to be completed is that between Paris and Rome, nearly 1,000 miles apart. This is wrongly stated by several of the English technical journals to be the longest telephone line in the world. Comment is also made on the cheapness of the tariff. The day rate, applicable between six in the morning and nine at night, is four francs, equivalent to about 80 cents, for three minutes' conversation, and the night rate, from nine at night to six in the morning two francs, or forty cents, which are certainly very moderate rates for such a long distance. These charges contrast very unfavorably with the tariff on the Paris-London line, which is two dollars for three minutes talking, day or night the same. The distance between London and Paris is only about a third of that between Paris and Rome, but of course the London-Paris line includes about twenty-four miles of submarine cable which greatly increases the cost of working. The lines from Paris to Berlin and Paris to Rome are all overhead and allow of cheaper rates being made.

CONTEMPORARY CROSS TALK

By "The Listening Key."

THE dividing line between flat rates and message rates should be drawn sharply at the small and isolated system, which is never likely to develop beyond a single exchange nor likely to be absorbed into a large neighboring system. This would confine the flat rate to small isolated systems in villages and small towns where the utmost possible development to be expected would not exceed a thousand subscribers or so, and where the nearest neighboring town or village would be sufficiently far off to make a toll rate for interconnection always right and proper. In such a system as this the weight of the argument is in favor of the flat rate and against the message rate, for the reason that in a small single exchange system the average method of determining costs and expenses is a fairly reliable guide, and is not liable to be upset by extreme variation in the requirements of different subscribers as it is in a large system. Further, in a small system the business reasons that support the message rate method in a large system hardly exist, and the greater simplicity and resulting economy in bookkeeping and office management of the flat rate make it decidedly preferable in a small system.

Small Self-Contained Systems

In a small self-contained system the chief thing to look after is the line costs. The average length of line allowed at the standard rate can be kept within proper limits either by establishing a zone beyond which mileage will be charged or by charging a mileage rate on lines extending over three-quarters of a mile or a mile from the exchange by actual line measurement. The average length of line is longer as a rule in small systems than it is in large because the population is more sparsely scattered, and country lines cost more to keep up than city lines do, so this point must be carefully looked after. The traffic of a small system is a simpler problem in all respects than that of a city system and the average is a much truer guide. To begin with the traffic is much lower as a rule and there are neither the extreme variations between the use of the different subscribers nor the extremely busy periods or "rush" hours, to cope with. There are no very busy subscribers in small systems and the traffic is much more evenly distributed over the day. These facts, taken with the purely local character of the traffic and the consequent simplicity of the exchange equipment, render the traffic easy and cheap to handle. Consequently in such a case the average is a fairly safe method and the flat rate, both for technical and business reasons recommends itself.

Large System Increases Traffic Costs

But the moment you have a system that has thousands of subscribers and more than one exchange, the average method of arriving at the rate is no longer a safe guide, and the flat rate should be abandoned in favor of the message rate. This means, of course, that the message rate should be adopted in any place where the system is likely to grow beyond a thousand or two of subscribers and beyond a single exchange. Directly you split up your district in two exchange districts, requiring trunk working, you at once largely increase the cost of handling the traffic; and moreover, in a place large enough to require two exchange districts you have a large and varied population, whose requirements in the way of telephone service will vary greatly, so that the average traffic is no longer a fair or reliable guide. In the small system the extremes of use of the service made by different subscribers may range between one call a day and perhaps fifteen or twenty calls a day. But in the large system the range of use will be very much greater. These facts make the average method no longer a fair one, and the fact that the traffic costs much more to handle, per call, in the large system makes the average method a very stupid one for the telephone man to employ.

Cater to Both Small and Large Users

Now the intelligent telephone man wants to cater both to the small and to the large telephone user. He wants to be able to supply service to the small user at a price that the small user can afford to pay, and he also wants to be able to supply to the large user a varied and extensive equipment and a large amount of service at prices that will yield a fair profit. At flat rates the usual modifications made of the standard rate are a lower rate for residence than for business service and a lower rate for party line than for direct line service. Therefore the flat rate manager, in his endeavors to vary his tariff in order to appeal to different classes of service, is restricted within very narrow limits. The lower rate for residence than for business service is a pure convention, a tenacious survival from the early days of wrong methods. In a small flat rate system it goes against the facts, as residences in small places are further away from the exchange than most business subscribers and therefore require longer lines, while the traffic of a residence station is often larger than that of a business station; so that in small places residence service really costs more than business service, yet it is furnished at a lower rate. If facts were allowed to be the guide, instead of convention, the tariff would be the other way about. Lower rates for party line service are strictly logical, as they are based on a division of the line costs, which are the principal item of expense in a small system.

Message Rates are Elastic

The message rate manager, on the other hand, instead of being restricted to one or two directions in which the tariff can be modified, has practically unlimited scope in adapting his tariff to the needs both of his own business and of the community he is serving. It is this elasticity which is such a strong feature of the message rate tariff, and the message rate manager is in the twice-blessed condition of working on methods that are technically correct and that provide a scheme which has a good business-like aspect to the general public. The small user who pays according to his use feels that he is being fairly dealt with, and the large user, who pays according to *his* use is a business man and easily recognizes the justice of a sound business principle. The message rate manager, in catering to small subscribers can make party line rates for small numbers of messages, can even, if he pleases, follow the convention of making a distinction in favor of residence service, can make cheaper rates for short distance messages, and in short, has a variety of schemes up his sleeve for attracting the small customer so as to teach him to use the telephone and start in the way of becoming a big one

Proportion Charges by Zones

There is one point that the message rate manager has not yet tackled, and that is making the minimum rate proportional to the length of the subscriber's line. This plan would be logical and just, would eliminate one of the unscientific averages that still clings to the message rate system, would appeal to the customer, and would give the message rate tariff still greater elasticity. Such a plan would be considered a startling innovation at first; most new plans are, the message rate system itself was, but one may expect to see it adopted by some enterprising manager before very long. As the line costs are a most important part of the expense of maintaining a telephone station, it is quite logical to vary the rate for each station in proportion to the length of line required to serve that station. This is done, by means of mileage rates, when the length of line exceeds a certain amount. Why should it not be done when the length of line falls below the fixed point at which mileage rates begin? There is no reason at all why it should not be done, and the principal objections that would be urged would spring from convention, custom and conservatism. To apply the principle to practice would be perfectly easy. Establish zones round each exchange, the first with a radius of say 300 yards, and each succeeding zone having a width of 300 yards, that is, the second zone would enclose a circular area with a radius of 600 yards from the exchange, the third one with a radius of 900 yards, and so on. Then make your minimum rate, say $24 for a subscriber in the first zone and charge $27 for a minimum rate in the second zone, $30 in the third and so on, and there you are.

ELECTRICAL MEASUREMENTS—ARTICLE VI.

THE VOLTMETER

By Arthur Vaughan Abbott.

It has been shown that the amount of water which will flow through any pipe depends on the resistance of the pipe and the pressure of the water in the tank to which the pipe leads. The same rules hold true for electrical conductors. The quantity of electricity which will traverse any circuit depends solely on the resistance of the conductors, and something, which, to electricity, bears the same relation that pressure does to water; that is something which makes the electricity go. This something has received the name of *electromotive force.* Of its real nature we know no more than that of the real nature of the pressure that causes a current of water in a pipe. Water pressure, or as it might be called *water motive force,* is measured in pounds, and is so familiar that we scarcely think of it. But the hydraulic engineer must know the pressure on all the pipes with which he deals or his plans will be at fault. In every gate house on the Croton Aqueduct there is a most elaborate system of instruments that keep a perpetual autographic record of all the pressures. To the electrical engineer a knowledge of electromotive force is just as important. Electromotive force is measured in *volts* and the ability of every source of electricity to force current through a wire or other resistance is expressed by stating that it has so many *volts.* Scientifically speaking the volt is defined as that pressure which will cause one unit of current to flow through one unit of resistance. But this really does not mean much, for the unit of current is the quantity of electricity which will flow in a circuit of *one unit* of *resistance* with a pressure of *one unit* of *electromotive* force and a unit of resistance is a circuit which will carry *one unit* of *current* under a pressure of *one unit* of *electromotive* force. So such unit is defined in terms of the other two, and an absolute definition is wanting, but it is easy to form a practical idea of a volt. Thus the ordinary gravity battery gives 1,076 volts, dry battery from .8 to 1.5 volts depending on the make. A storage battery about 2 volts; a ringing generator about 90 volts, and the ordinary Edison circuit 110 and 220 volts.

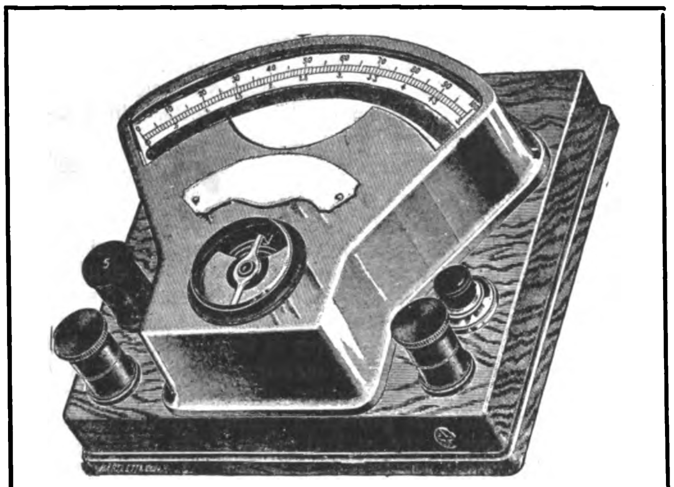


FIG. 1.

Suppose an hydraulic engineer wished to make an instrument to measure water pressure. He could take a very small long pipe, or one whose resistance is very large and attach it to a tank in which there was a known pressure and measure the flow of water, by quart cup for example. Subsequently if the *same tube* was attached to any other tank having an unknown pressure, the quantity of water delivered could be used to calculate the pressure. Twice the water would mean twice the pressure, and half the water half the pressure, and if the tube was very small the quantity of water lost in the experiment would be insignificant. This is exactly what the electrical engineer does. He makes a galvanometer having a coil of very small wire with a great many turns, or in other words of *very great resistance.* He attaches this galvanometer to any standard source of electricity, say a gravity battery, reads the deflection of the needle, and thus gets the constant of the instrument. If, at some future time, he wishes to measure the voltage of some unknown source of electricity, he attaches the galvanometer to it, reads the needle and writes the following proportion:

The first deflection: the second : : the voltage of the second: to the voltage of the first.

To avoid the labor of making this calculation every time it is easy to graduate the scale of the galvanometer to read directly in volts. Such instruments are called *voltmeters;* those made by the Weston Company being most widely known. Essentially, volt meters are nothing but very carefully and compactly arranged D'Arsonval galvanometers, similar to the one described in The American Telephone Journal of February 7. The type made by the Weston company is almost too well known to require description, but is shown in Fig. 1, while Fig. II gives some of the details of construction. A powerful horseshoe magnet is enclosed in the brass case that rests on the base board of the instrument. Between the poles of this magnet there is a fine wire coil delicately pivoted in jeweled bearings. This coil carries a needle that playes over a graduated scale seen in Fig. 1 from which the indications are read. Two hair springs serve to keep the coil under a certain definite tension and make the scale reading equal divisions. Long experience and great care in workmanship have brought these instruments to the highest state of perfection. The Weston instrument is very small, light and portable; requires no adjustment, but is ready to use as soon as set; does not require extraordinary care in transportation, the needle can be read instantly, and its indications need no calculation; is unaffected by even very powerful magnetic fields.

As this type depends on a permanent magnet it is necessary for very accurate work to recallibrate each instrument at intervals, as the magnet may change with age. As it is impossible to secure in one instrument the capacity to read all possible voltages, a number of different voltmeters are made, and one can secure almost any desired range from a hundred thousandth of a volt to ten thousand volts. The most useful all round size for the telephone exchange is the No. 4. This instrument has a double scale reading from 0 to 150 by single volts, and from 0 to 15 volts by 1-10 volts, and should be provided with a reversing and contact key. The uses of the voltmeter will be discussed in the next number, and circuits given of the various tests which can be made with this instrument.

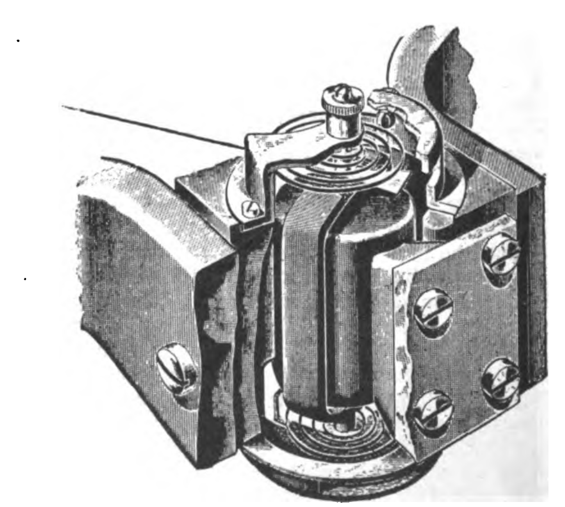


FIG. 2.

Editor's Note.—The first article of this series appeared in the issue of January 17. They will continue for about a year.

Patents

ANTISEPTIC MOUTHPIECE ATTACHMENT.

Charles W. Clough, of Watsonville, Cal., patents (No. 720,783), an antiseptic attachment for telephone-mouthpieces. The object of this patent is to provide an improved method of rendering transmitter mouthpieces antiseptic. It consists of a sterilized paper or other material coated with gum or other sticky compound by means of which it can be made to adhere to the mouthpiece.

TELEPHONE RECEIVER-HOLDER.

Arthur J. Briggs, of Allegheny, Pa., patents (No. 720,880) a telephone receiver-holder. The object of this patent is to provide a holder so that the receiver and transmitter may be adjusted to fit the ear and mouth of any user, and arranged at any angle or any height. It is illustrated in Fig. 1. The bar 7 is provided with the joints 10 and 11, and the adjusting screw 9, which allows it to be flexible in all directions and clamped rigidly when properly set.

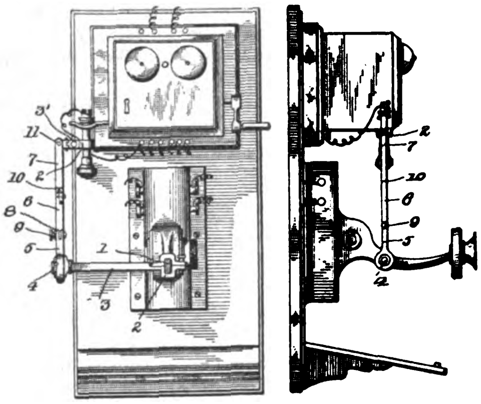


FIG. 1.

SELF-INDICATING RINGING KEY.

George L. Burlingame, Chicago, Ill., patents (No. 720,885) and assigns to the Kellogg Switchboard and Supply Company, a self indicating operator's key. The object of this invention is to provide a means whereby at all times, the key shall indicate to the operator, the operation last performed. It is illustrated in Figs. 1, 2 and 3. The key contains four springs by means of which four ringing combinations are possible. When the operator releases the key, the handle remains in such a position as to denote the spring last used. Hence the operator always knows exactly how to make a second ring if desired.

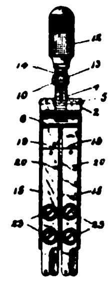


FIG. 1.

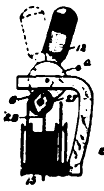


FIG. 2.

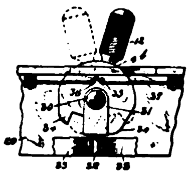


FIG. 3.

COMMON BATTERY SYSTEM.

Francis W. Dunbar, Chicago, Ill., patents (No. 721,124) and assigns to the Kellogg Switchboard and Supply Company, a central energy telephone system. The object of this patent is to provide an improved switchboard circuit for common battery exchanges; it is illustrated in Fig. 1. This particular patent relates to the use of an improved relay *b*, used as the cut-off relay, with a third conductor (which may be the ground), at its center. In other respects the circuit closely resembles that patented by Mr. Dunbar, November 12, 1901, and re-issued September 16, 1902, which have been fully described in these coumns.

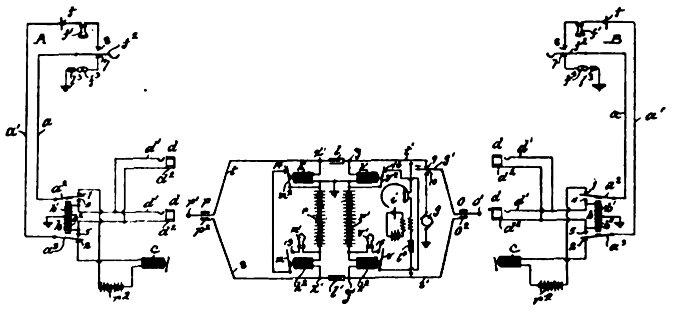


FIG. 1.

Queries

VOICE CURRENTS.

1. How do scientists arrive at the conclusion that voice talking currents vibrate so many times per second?
2. What are the maximum and minimum number of cycles per second for male and female voices?
3. What is the length of the longest and shortest voice wave?
4. How many loads per wave length does Prof. Pupin place in his circuits?

C. H.

1. Sound is known to be a vibration due to air waves. As a telephone receiver emits sound, its diaphragm must vibrate. To set the diaphragm vibrating, the magnetism of its magnet must change. This can only be effected by an alternating current passing through the receiver coil, consequently telephonic currents are alternating currents.

2. The lowest musical sound is about 32 vibrations per second and the highest 4,752. Male voices range from 48 to 2,500 per second and female from 112 to 3,200 per second.

3. The length of vocal sound waves varies from about three inches to about thirty-five feet.

4. It is reported that Dr. Pupin recommends from six to twelve coils per line mile for open wire lines.

UNDERGROUND CABLES WITHOUT CONDUITS.

I am cabling my telephone system. It has been suggested by practical telephone men that I put my cables underground without laying conduits. There are no electric cars in the town and the cables would be free from all such troubles. I may use tiling or a wooden trough for the cable to lie in. Do you think it will work all right and not wear out from the action of anything in the earth?

J. W. M.

Many attempts to use cables buried in the earth without conduit have been made. Experience has shown that the probability of injury to the cable, due to disturbances of the street and the inability to easily repair such injury are so great as to make this method of installing cables unprofitable and undesirable. You will find that a conduit system of some kind is much more satisfactory and in the long run much cheaper.

GOOD FOR INDEPENDENTS IN MAINE.

A DISPATCH from Augusta, Me., says: The steering committee of the State Grange has a bill nearly ready for introduction in the legislature removing practically all the corporate rights belonging to telephone companies.

It is said that the bill will wipe out the clause which makes it obligatory for a new company to receive permission to erect a line in a territory covered by existing companies.

This will make it as easy for a telephone company to organize and go ahead after getting municipal grants as it is for grocery stores to open up.

It is said that the bill will provide further that new companies may connect with any existing companies and compel the latter to forward all messages to the limits of their lines.

The Week's Messages.

NEW COMPANIES

COURTLAND, ALA.—S. S. Pippen, of this place, is getting subscribers to a city telephone line. He will commence construction within the next thirty days.

NEWARK, ARK.—The Newark Telephone Company has been incorporated under State laws, with a capital stock of $10,000. C. J. Magness is president.

PARAGOULD, ARK.—J. W. Seay and other citizens of this place have organized a company to operate a telephone line between Paragould and Walcott. Capital, $5,000.

BURROWS, IND.—A telephone company has been organized here with over forty members. The following officers were elected: M. J. McGreevy, president; N. C. Martin, secretary; O. N. Glasscock, treasurer.

CASTLETON, IND.—The Castleton Telephone Company has been incorporated with $1,000 capital. Directors—R. S. Irwin, president; Willard Herrin, secretary; S. T. Beaver, treasurer; C. F. McIlvain, O. M. Easter, J. O. Kitterman and A. J. Russell.

CLAY CITY, IND.—The Harrison Township Telephone Company has been incorporated with a capital stock of $5,000 and will do business at Clay City. The directors are: J. H. Horton, John Willen, Edison E. Aberholtzer, V. E. Brown and Levi L. Johnson, all of Clay City.

GREENFIELD, IND.—The Hannah & Jackson Telephone Company, of Greenfield, has been incorporated with a capital stock of $5,000; directors, W. H. Marsh, C. H. Hannah, J. W. Jackson, Coleman Pope.

INDIANAPOLIS, IND.—Wm. D. Wilbert, A. Anderson, A. L. Magee, Henry D. Holt, Cicero Newhouse, Nathan P. Hinton and Hervey Coldagier, farmers of Hancock County, have incorporated the Home Telephone Company, of Hancock County, with $170 capital.

KNIGHTSTOWN, IND.—The Knightstown Six-Mile Telephone Company has been incorporated with $200 capital. Directors, Robert S. N. Oldham, Minor M. Thomas, Ithamer White, Chas. Mattix and Frank Boren. It will operate in Henry and Hancock counties.

OAKLANDON, IND.—The Oaklandon Telephone Company has been incorporated with $1,000 capital. Among the incorporators are John Moore, John M. Emery, F. M. Kimberlin, Henry Alford, J. T. Newkirk, O. A. Klepper and T. A. Silvey, all of Oaklandon.

WAKARUSA, IND.—Farmers in Madison and Penn townships, St. Joseph County, who reside west of Wakarusa, are preparing to organize a mutual telephone company.

WILKINSON, IND.—The Farmers' Co-Operative Telephone Company has been incorporated with a stock of $1,000 and will do business in and about the town of Wilkinson. The directors are Samuel M. Overman, Robert E. Simmons, Jacob E. Burns, Lee L. Neff, John W. Noland, James Tutterow and Benjamin H. Cook.

WORTHINGTON, IND.—John Davidson, of Lyons, was here recently seeking subscriptions to the capital stock of a company whose ultimate object is to consolidate all the telephone companies in the county under one management. Those who have already signed the preliminary papers are: For $5,000, John F. Slinkard and Z. P. East; for $1,000, N. G. Dixon, H. Laughlin, O. F. Herold, C. E. Davis, D. M. Bynum, Joe Moss, F. M. Dugger, C. C. Ballard, L. H. Jones, Frank Ramsey, E. and M. Stein, D. J. Terhune, M. F. McIntosh, Amos Musselman, W. D. and Sue Killion, C. A. Maxwell and J P. and Nora McIntosh; for $500, J. A. Phillips, W. V. Moffett, L. H. Stalcup, C. E. Welch, John Davidson, F. M. Harwood, B. A. Rose, Josephus Inman, J. M. Humphreys, W. C. Bennett, N. G. McIntosh, Ed E. Knapp, Win Wright and H. D. Haxton.

ATLANTIC, IA.—Farmers of Washington Township have organized a telephone company. The line will be built from a point about four miles west of the city and will connect with the Musson central office. The Musson Bros.' Company has given the project its hearty support. The following are officers and stockholders: J. B. Jipsen, secretary and treasurer; stockholders, C. W. Guttenfelder, Peter Hausen, Fred Jipsen, Henry Jipsen, Ora Berry, Carl Brehmer, Henry Barnholdt and Henry Brehmer. As soon as material can be secured the line will be built.

GROVELAND, IOWA.—A telephone company has been organized here to construct and operate a line from Lacelle to Osceola. Officers were elected as follows: President, Edgar Bell; secretary, Wm. Bell; treasurer, Wm. Leeson. The company will use the poles on line east of Lacelle part of way. Several spurs will be built for the convenience of stockholders.

LIBERTYVILLE, IOWA.—The Libertyville Telephone Company, of Van Buren and Jefferson counties, has filed articles of incorporation with the Secretary of State; capital $7,000; by George G. Bowers, S. K. Davis and others.

MINBURN, IOWA.—The Minburn Mutual Telephone Company has been incorporated with a capital stock of $20,000 by W. P. Kenyon and others.

PRINCETON, IOWA.—At a meeting of farmers at the Bluff school house, a farmers' mutual telephone line was organized to connect McCausland and Princeton with various side lines. The officers of the company are as follows: President, L. W. Pape; secretary and treasurer, C. A. McCaru; manager, Joseph Graham, these officials to constitute a board of trustees and to have full charge of the work, which will be commenced at once.

STUART, IOWA.—There was a meeting recently at Penn school house in the interest of a farmers' mutual telephone line from Dale City to Stuart. The prospect is that the line will be built. There will be another meeting soon at Seager. Peter Hilgren and L. P. Viele are the chief promoters.

HARMONY, ME.—A company has been organized here for constructing local farmers' telephones, with Clement Hight president, C. C. McLaughlin, secretary, and Gorham Magoon, treasurer.

BARNSTABLE, MASS.—The Cape Cod Telephone Company has been incorporated; capital stock, $1,000; F. Percy Goss, president; Arthur G. Guyer, treasurer.

HOKAH, MINN.—Sixteen farmers have just organized the Union Valley Telephone Company, which will run a line into Hokah. The officers are: J. Z. Klein, president; Joseph Ormsby, secretary; Fred Bernsdorf, treasurer.

OREGON, MO.—The Holt County Farmers' Mutual Telephone Company has been organized.

NEW BRUNSWICK, N. J.—People's Co-Operative Telephone Company of New Jersey, principal office, New Brunswick, has been incorporated, capital, $100,000. Incorporators: John B. Yeager, Frederick C. Kirkendall, George S. Alexander, Harry S. Peets, Andrew C. Raub, Joseph L. Dunn, Wilkesbarre, Pa.; Waats V. D. Clark, Theodore E. Townsend, New Brunswick.

TRENTON, N. J.—The Central New Jersey Telephone Company has been incorporated, principal office 18 South Stockton street, Trenton; capital, $100,000. Incorporators, Frederick J. Randolph, Bruce Bedford, Charles W. Wright.

TRENTON, N. J.—Central Illinois Telephone and Telegraph Company has been incorporated here with a capital stock of $500,000. Incorporators, Louis B. Daily, Kenneth K. McLaren and H. O. Coughlan.

ALEXANDRIA BAY, N. Y.—The Alexandria Bay Telephone Company, of Alexandria Bay, has been incorporated with a capital stock of $2,000. A. C. Cornwall, J. T. Fuller, Gorham L. Olds, incorporators.

NUNDA, N. Y.—The Rural Telephone Company has been organized here and will incorporate in three counties. The following committee is soliciting subscribers: William Paine, Bert Robinson, Merwin Aylord, John Eisaman, William Vannostrand, Fred Willett, L. A. Doolittle, L. D. Bennett and Fred Nusbickle.

PENN YAN, N. Y.—The Torrey Telephone Company was formed at Legg's Corners recently, with the following directors: Frank Kipp, Ezra J. Thayer, Frank E. Spencer, E. A. Gillette, William Pulver, Charles Whitaker and Frank Cole. Immediately after the election of directors the following

THE WEEK'S MESSAGES—Continued.

officers were chosen: Frank E. Spencer, president; E. A. Gillett, treasurer and secretary. The new company will be connected with the Inter-Ocean switchboard in this village.

HANNIBAL, OHIO.—A new telephone company has been organized at Hannibal, and work of stringing the wire will be commenced as soon as the weather will permit. The first line will be from Hannibal to Round Bottom, where it will connect with the Home Telephone Company's line, running from Clarington to Woodsfield. All of the towns within a radius of twenty-five miles will be connected by the new line of telephone, and many of the isolated towns of Monroe County will be connected that have heretofore been without telephone communication.

KIDRON, OHIO.—The Kidron Telephone Company of Wayne County, has been incorporated with a capital stock of $15,000 by Valentine M. Gerber, Jacob P. Rammer, Charles Gerber, J. F. Armstutz and John J. Bixler.

PHALANX MILLS, OHIO.—A meeting was held at the home of W. O. Chaffee, at Phalanx Mills, recently, for the purpose of raising funds for the organization of a telephone company. A telephone line will be built from Leavittsburg via Braceville Center, Phalanx Station, and Phalanx Mills. A central is to be placed at Phalanx Station.

TAMAH, OHIO.—A new telephone company has been organized here. W. L. Groves and Dee Fast are the promoters.

MANSFIELD, PA.—Another rural telephone line will be built at once to enter the Mansfield Farmers' Mutual and Citizens' exchange. The following well-known gentlemen have just been chosen as officers: C. J. Rexford, president; Carl Husted, secretary, and Seymour Shaw, treasurer.

PITTSBURG, PA.—A certificate of incorporation has been filed at Dover, Del., for the Pittsburg Financial Company, with $1,000,000 capital, to construct, maintain and operate telephone, telegraph and pipe lines of all descriptions. William McKinley and Frank Haskell, of Pittsburg, and William M. Phyle, of Wilmington, Del., are the incorporators.

SANGERSVILLE, VA.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of not less than $1,000 nor more than $5,000. Its main office will be here, but it is authorized to maintain offices in other places. The officers are: Abraham Sanger, president; Samuel Hess, vice-president; L. V. Miller, secretary; A. J. Miller, treasurer.

RIO, WIS.—The Peerless Telephone Manufacturing Company, of Rio, Columbia County, has been incorporated with a capital stock of $10,000, divided into 100 shares of $100 each; incorporators, J. L. Farington, Charles Caldwell and David Robertson.

FINANCIAL.

BYRON, ILL.—The stockholders of the Byron Telephone Company have voted to increase the capital stock to $10,000.

CALEDONIA, ILL.—The Boone County Co-Operative Telephone Company has increased its capital stock from $7,500 to $15,000.

MANHATTAN, ILL.—The Manhattan Telephone Company has increased its capital stock from $2,400 to $5,000.

WINDSOR, ILL.—The Windsor Mutual Telephone Company has increased its capital from $10,000 to $25,000.

BLOOMFIELD, IND.—The Home Telephone Company is to be reorganized and enlarged and reincorporated with a capital stock of $100,000. Its ultimate object is to build more lines into the northeast, west and northwest part of the county and merge the Independent plants of Worthington, Lyons and Marco into the system, making it a universal Independent system of Greene County. The plant already is a money-maker and the long distance tolls are a source of considerable profit.

BOSTON, MASS.—The Missouri & Kansas Telephone Company reports for the year ending December 31, 1902:

	1902.	1901.
Gross	$1,228,436	$1,056,638
Operating expenses	956,993	814,790
Depreciation	50,000	50,000
Net	221,443	191,847

BOSTON, MASS.—The Mexican Telephone Company earned $21,291 gross in December and $10,420 net—a gain in the former of $2,647 and in the latter of $509. For ten months of the fiscal year, to December 31, the gross income was $203,466 and the net $93,917. The company now has 4,412 subscribers—an increase of 528 over last year and a gain since March 1, 1901, of 481.

ROCKINGHAM, MO.—The Stet, Rockingham & Norborne Telephone Company will in April increase its capital stock to $15,000.

BUFFALO, N. Y.—The Independent Union Telephone Company of Buffalo has filed with the Secretary of State at Albany a certificate of increase of capital stock from $200,000 to $1,000,000. This company has its principal offices at Elyria, Ohio, not having yet been able to make arrangements for entering this city. The nearest exchanges to Buffalo that it has yet been able to establish are at Niagara Falls and at Lockport, but the greater part of its business is done in the neighborhood of Albany.

HARRISBURG, PA.—The Cumberland Valley Telephone Company declared its first dividend of one per cent. The company, whose lines are controlled by the United Telegraph and Telephone Company, is connecting its lines in the Lykens Valley, Dauphin County, with those in Schuylkill County as far as Pottsville. The company's agents have been adding telephones rapidly lately.

FRANCHISES.

LONG BEACH, CAL.—J. C. Brainerd, of Pasadena, has secured the telephone franchise offered for sale by the City Trustees for the sum of $300.

SANTA BARBARA, CAL.—At a meeting of the Council, W. R. H. Wagner made application for a franchise for the Home Telephone Company. The company agrees to make many concessions if given the franchise, including underground wires, the expenditure of $40,000 in installing a plant, free telephones to the city and a deposit of $5,000 to bind it to its specifications.

FREEPORT, ILL.—Dr. Clay, president of the Pearl City Telephone Company, has presented a petition to the board asking for a county franchise and the right to supply the farmers of the county with telephones. The petition was referred to the committee on roads and bridges.

IRETON, IOWA.—The City Council of Sioux City has called a special election for the purpose of voting on the proposed granting of a franchise to the Ireton Local Mutual Telephone Association.

SIOUX CITY, IOWA.—T. A. Thompson and William Milchrist have asked for a telephone franchise in Sioux City.

GLASSBORO, N. J.—The Township Committee of Harrison Township has granted the Eastern Telephone Company of Camden a franchise.

DEMING, N. MEX.—The Village Trustees of Deming have granted a franchise to the Luna County Telephone Company. The representative of the company has already secured over forty subscribers. Work on the construction of the line is to begin this month.

CINCINNATI, OHIO.—The Fitzsimmons Telephone Company has applied for permission to construct some additional lines here. Cleveland and Cincinnati capitalists are endeavoring to use the franchise granted to this company as the foundation for an Independent telephone company.

GUTHRIE, OKLA.—The Indian Territory Telephone Company has been granted a franchise for a telephone line from Tulsa to Choska, where connection will be made with the Muskogee National Telephone Company's line.

WESTERLY, R. I.—The Westerly Automatic Telephone Company has asked permission to extend its lines through the towns of Westerly, Hopkinton, Richmond and Charlestown.

CHATTANOOGA, TENN.—Mrs. Anne McElroy Brett, who has asked the City Council to pass an ordinance granting her a franchise right to construct an Independent telephone system in Chattanooga, has returned to the city. She will renew her fight for the franchise.

RATES.

GREAT FALLS, MONT.—The Great Falls & Lewiston Telephone Company is now engaged in revising its schedule of tariffs and on and after April 1 there will be a material reduction in the rates. The revised figures are not yet given out, but it is expected that the reduction will average about thirty per cent. Superintendent J. S. Campbell, of the Great Falls Exchange, will shortly go to Salt Lake as manager of the exchange in that city.

ELECTIONS.

HILTON, IOWA.—The Hilton-Iowa Telephone Company has re-elected the following officers: President, H. W. Maas; vice-president, Fred Pundt; secretary, John Ahrens; treasurer, George Trimpe; directors, George Lienen, Dick Maas, Dick Heitshusen, George Maas and August Hudepohl.

IOWA CITY, IOWA.—At a recent meeting of the stockholders of the Sharon Mutual Telephone Company the following were elected to serve as directors for the coming year: George Lewis, Clarke Crupe, John Justice, Frank Smith. During the meeting the question of connecting with the Wagner telephone lines was discussed, and it was decided to connect all of the lines with the exception of the one going to Williamsburg.

STANTON, IOWA.—The annual meeting of the Telephone Central Association was held recently, and the association appropriated $45 towards putting on a commercial line between Stanton and Villisca. T. H. Donahue was elected president, C. G. Lind secretary, and John Olander treasurer.

LEXINGTON, KY.—The stockholders of the Fayette Home Telephone Company elected directors for the ensuing year. The reports of the officers were received and show a prosperous year. The board of directors is the same as the old one, with the exception of C. C. Patterson, who was appointed upon the resignation of Richard Gibson. The new board is as follows: Col. W. C. P. Breckinridge, John T. Shelby, John R. Allen, Frank A. Bullock, L. G. Cox, George K. Graves, Chas. E. Kerr, Jos. Botts, George A. Bain, J. W. Stoll, Jouert Shouse, Ed. M. Wallace, C. C. Patterson, James S.

THE WEEK'S MESSAGES—Continued.

Brailey, Jr., Charles N. Manning, J. Henry Zitt, E. W. Shanklin, Thomas A. Combs, David Barrow, Robert L. Baker, Desha Breckinridge.

LOUISVILLE, KY.—The annual meeting of the stockholders of the Louisville Home Telephone Company was held at Dover, Del. The following board of directors was elected: John A. Armstrong, E. M. Coleman, Donald M. Donald, E. Rice, C. D. Knoefee, E. L. Barbour, John P. Starks, C. J. Bickel, C. J. Doherty, Matt O'Doherty, W. C. Garland, J. D. Powers and J. G. Gray.

CANNONSVILLE, N. Y.—The following have been elected officers of the Cannonsville and Deposit telephone line: Virgil Boyd, president; N. H. Faulkner, secretary; E. A. Boyd, treasurer.

NEWBURGH, N. Y.—The annual meeting of the stockholders of the Colonial Telephone Company of Newburgh was held recently. The president's report showed that the company was gradually increasing in proportions, there now being in the city of Newburgh 461 telephones; also the company's lines are now connected with sixty-five towns throughout Orange County, to the most important points, and into New Jersey and Pennsylvania. It is expected that by spring time communication will be had with Albany, where the lines are now connected through to Schnectady, Utica, Geneva and Rochester. After finishing the reading of these reports, the following persons were elected directors for the ensuing year: S. V. Schoonmaker, W. G. Taggart, C. D. Robinson, H. B. Odell, J. Lawson, H. A. Bartlett, W. H. Coldwell, Geo. G. Otis and F. W. Wenzel. The directors elected the following officers: S. V. Schoonmaker, president; W. G. Taggart, vice-president; H. A. Bartlett, treasurer; Geo. G. Otis, secretary and general manager.

ONTARIO, N. Y.—At a recent meeting of the Ontario & Steuben Telephone Company, H. W. Blake was elected president, W. W. Holcomb, secretary; W. H. Housel, treasurer; John Bolles, auditor; D. D. Cottrell, tax adjuster. Directors: C. L. Lewis, George B. Hemenway, Naples; D. D. Cottrell, North Cohocton; F. S. Richardson, Ingleside. A dividend of twelve per cent. was declared. The meeting adjourned for one week when the extension of the line will be considered.

SCHNECTADY, N. Y.—Howard Hendrickson has resigned as president of the Schenectady Home Telephone Company, and Charles F. Veeder has been elected to succeed him. It was decided to increase the directorate of the company by the election of the following: Charles F. Veeder, Charles E. Palmer, E. S. Kellogg, H. C. Hequembourg, John F. Deems, R. M. McNaughton, H. E. Webster. Treasurer S. M. Strong presented his reports, showing that the organization is in a prosperous condition. Mr. Strong was elected secretary and manager. The report showed the plant to be in a very satisfactory condition. Over 400 telephones are now connected to the exchange and a large number of new contracts are being made daily for service.

VAN VOORHIS, W. VA.—The Farmers' Telephone Company of Monongalia County, headquarters here, held its annual meeting recently and elected these officers: Isaac Van Voorhis, president; Forney S. Miller, secretary; A. M. Sterling, Dr. W. A. Brown, F. S. Miller, auditors: I. Van Voorhis, Springer Morris, A. M. Sterling, E. G. Moore, L. N. Johns, M. Van Voorhis, Blaine St. Clair, A. Maple and F. S. Miller, directors.

COMPETITION.

NEW ALBANY, IND.—Union labor has arrayed itself against the Cumberland Telephone Company. The Home company acceded to a request of the linemen for an increase of wages, but the Cumberland refused. The City Council has ordered the Bell company's instruments to be taken out of the police station and reel houses; the County Commissioners revoked the franchise of the company to the use of the highways, and strikers' sympathizers are ordering out their telephones by the wholesale.

PADUCAH, KY.—The People's Independent Company will open its exchange March 1. The Merchants' Association, comprising nearly all the merchants and professional men in Paducah, in order to reduce the expense of telephones, asked both companies for propositions recently, and the East Tennessee declined to make any reduction. The association then adopted the Independent company, and has a signed agreement from several hundred citizens to use only the Independent company.

COMBINATIONS.

LAKEVIEW, IOWA.—The telephone line that runs northwest from Lakeview, formerly owned by the State Telephone Company, has been purchased by the Farmers' Telephone Company.

HAYS CITY, KAN.—The Hays City Telephone Company has bought the entire plant of the J. S. Haley Telephone Company in Hays City.

ORD, NEB.—The Ord Independent Telephone Company has bought the Ericksen line from the Burwell folks.

CALDWELL, OHIO.—The Monroe County Telephone Company has passed out of existence, its holdings being merged in the Home Telephone Company, another local concern.

CONNELLSVILLE, PA.—The Maryland, Pennsylvania & West Virginia Telephone Company sold to Uniontown and Connellsville business men. The consideration was $40,000. Those interested in the purchase are: J. M. Reid, Charles Davidson and J. C. Moore, of Connellsville; R. E. Umbel, S. M. Graham, Ira Partridge, D. M. Hertzog, R. F. Hopwood, J. C. Work, ex-Judge Nathaniel Ewing, A. D. Boyd, Frank H. Rosboro, J. M. Core and Frank M. Semans, of Uniontown. The intention of the new owners is to make the Tri-State line strictly first class. Money will be spent where it is needed and the lines will be extended so connection can be made with the Independent companies in Pittsburg. The rates will not be advanced. In view of the contemplated arbitrary action of the Bell company the prospects for the Tri-State company are very encouraging. S. M. Graham will be treasurer.

PRICE, UTAH.—Whitmore Bros. & Ballinger have sold the telephone line running from Price to Ferron, a distance of forty-five miles, to Levi N. Harmon, A. E. Wall, Oliver J. Marmon and Albert Bryner. All four are identified with three mercantile houses at Price, Huntington and Castle Dale, and the purchase is more for their own accommodation for the chain of stores than as a revenue getter, though the line caters to commercial business. A new schedule of prices and a lower scale of rates is said to be contemplated.

LEXINGTON, VA.—Sixteen telephone holders on the line known as Collierstown line No. 5, otherwise the Rockbridge Telephone Company, have purchased that line of A. S. Montgomery and A. Elhart. This sale gives another company in the Buffalo district the right to come into Lexington and connect with the switchboard of the Lexington Mutual Telephone Company, since the Rockbridge company controlled that privilege. The price paid was $610. Another new line is being organized for the vicinity of Kerr's Creek, fifteen subscribers already having been secured.

UNDERGROUND

PORTLAND, ME.—The North Eastern Telephone Company has petitioned the Council for permission to construct about nine miles of conduits through the congested district and the location of 1,000 poles.

TRENTON, N. J.—The Inter-State Telephone Company will shortly put its wires in Bridgeton under ground. Work will begin as soon as weather will permit.

WEST CHESTER, PA.—It is expected that the council will pass an ordinance soon by which the Delaware & Atlantic Telephone and Telegraph Company may put its wires here underground.

CONSTRUCTION.

SYDNEY, N. S., CANADA.—B. W. Chipman, president; Dr. Fraser, director, and J. H. Winfield, general manager of the Nova Scotia Telephone Company, are in the city. These gentlemen are directors of the Eastern Telephone Company, and at a meeting plans and estimates were discussed and expenditures aggregating $58,000 for the improvement of the service were decided on. The improvements include more underground work at Sydney and a new line from Sydney to Port Hastings. Work on this line will be begun in the early spring, and it is expected to be in operation by August. The directors also decided on a large expenditure at North Sydney and a new line to Louisburg.

CHARLES, GA.—Charles E. Adams, of Charles, who owns a telephone system in Stewart County, is thinking of extending it to Columbus. He has practically decided to build from Cottonton, Ala., to Columbus via Oswichee and Fort Mitchell. The line would also be in connection with Hurtsboro.

EL PASO, ILL.—The El Paso Telephone Company has called a special meeting for March 3 to consider increasing the capital stock with a view to cabling its lines and making other improvements.

OTTAWA, ILL.—The Inter-State Telephone Company contemplates establishing a toll line at Morris and later may establish an exchange.

VERMONT, ILL.—The Otter Creek Telephone Company is the name of a new farmers' line being built to Vermont.

FAIRMOUNT, IND.—The new Citizens' Telephone Company has commenced the work of constructing its plant. The rooms for the central office are being prepared for occupancy and the promoters say that they hope to be ready for business by fall at the latest.

INDIANAPOLIS, IND.—The growth of the New Telephone Company continues steady and large. Over 300 telephones were added in January. The total is now beyond 6,000. The New Long Distance company will spend $75,000 to $100,000 in the spring for extensions, which will include a new circuit to Lafayette and two new circuits to Richmond.

MARION, IND.—Farmers living along the road between this city and Arcana will build a nine-mile telephone line for which they have secured right-of-way. It is not contemplated to organize a company, but the line will be extended as demanded. Some of the men back of the enterprise are Geo. Wilson, Wm. Hayes, Alva Nesbitt, James and George Strange, Sam. Fite, Jack Bole, Andrew Ferguson, Charles Nelson, Alonzo Carr and David Taylor.

MUNCIE, IND.—The Delaware and Madison Counties' Telephone Com-

THE WEEK'S MESSAGES—Continued

pany has secured rights of way for a new line between Alexandria and Summitville.

WAKARUSA, IND.—The Wakarusa Telephone Company is installing an exchange at "Klondike," six miles northwest of Wakarusa. The system will soon be in working order, the first consignment of poles having just arrived. Over thirty subscribers have been secured. The new line will become a part of the company's main system, the central station for which is located in Wakarusa. Frank W. Brown is manager.

ALGONA, IA.—The promoters of the newly organized East Union Telephone Company have let the contract for the construction of the line to Myron Schenck for $47.25 per mile, the line to be ready for operation by June 1st. The wire is to be the best iron. It is not settled what instruments are to be purchased. The East Union line will be approximately ten miles in length.

BURLINGTON, IA.—The Burlington-Augusta Telephone Company has secured the right of way on the Fort Madison road and has begun the work of setting the poles for the subscribers already signed.

DES MOINES, IA.—The Hawkeye Telephone Company has a force of men putting in farm lines south of Waukee.

STAFFORD, KAS.—The Stafford Home Telephone Company will probably build a toll line early in the spring that will put Stafford in connection with all towns now reached by the Rock Telephone Company, the line connecting with that company's line. The Stafford company has been in operation over eight years and has a city exchange of about 100 subscribers.

STAFFORD, KAS.—The Stafford Telephone Company, of which the Lardue Brothers are proprietors, is building a short party line, which will have about four stations. This is for the benefit of the rural residents, who are very desirous of telephone connections. Stafford now has toll line connections with Wichita, Hutchinson and other important points in Central Kansas.

STOCKTON, KAS.—The Stockton Telephone Company is planning to construct a seventy-mile toll line and a twenty-mile party line. It has recently purchased a new switchboard.

BENTON, KY.—The Benton Telephone Company contemplates the construction of a line to Murray.

LEYDEN, MASS.—There was a meeting of the citizens of Leyden recently to consider the subject of introducing a telephone line into that town. A committee consisting of W. A. Barber, A. J. Shattuck and Rev. E. D. Lane were chosen to canvass the town and report in two weeks. It is hoped that enough subscribers can be secured to warrant an extension of the new Bernardston and Gill Telephone Company.

SALISBURY, MD.—At the annual meeting of the stockholders of the Maryland and Delaware Telegraph and Telephone Company, held here, the expenditure of $150,000 for building of the lines in Virginia was passed upon favorably.

TRUMP, MD.—The Union Telephone Company, of this place, will soon have its line finished to Parkton. It contemplates the extension of the line to Freelands. S. S. Van Trump is treasurer and manager.

BRIGHTON, MICH.—The Livingston Telephone Company will extend its line from this place to Plymouth. It is the intention of the company to get to Detroit from this place over the People's line.

HANOVER, MICH.—The Belt Line telephone around the village will soon be built. The company has forty-three members. The officers are: Frank Fowler, president; J. B. Wilson, secretary; Fred Sears, treasurer.

HOLLIDAY, MO.—Three divisions of the proposed People's Telephone Union will begin operation in Monroe county by March 1, one at Holliday and the other at Goss. Smith Jones is president of the Holliday division; Judge Adams, vice-president; John A. Wilson, secretary, and Jack Akers, treasurer.

ARLINGTON, NEB.—The Arlington Telephone Company has closed a deal for a lot on which it will erect a central office at once.

AUBURN, NEB.—The Auburn Telephone Company, which has recently completed several country lines and which now has the material on the ground to begin the Brownville system, is planning still further extensive additions to its system. A line will be run directly east from the city to the vicinity of Brownville, and another east from a point two miles north of town branching from the Julian line. From the line running south from the city two extensions will be made, one going south and one west. The Bracken line will also be extended several miles southeast.

GENEVA, NEB.—The Fillmore County Telephone Company is making contracts in this vicinity for farm telephones, an east and west line across Liberty having been constructed and also a line northeast of Exeter being under headway. The Saline County Company has contracted the county line for six miles east to be connected with the Friend exchange.

COOK'S FALLS, N. Y.—G. I. Treyz has secured the right of way for a telephone line of the farmers between the Falls and Roscoe to connect with the long distance line at the latter place.

COOPERSTOWN, N. Y.—The Oneonta Telephone Company has received a new switchboard, which is the counterpart of the one now in use, thus doubling the capacity. The two boards will accommodate 1,200 subscribers. A new cable of 75 pairs of wires is about to be strung.

DELHI, N. Y.—S. F. Adee contemplates building a new line from the county seat to Walton next spring. There will be but two stations, Delancey and Hamden.

LOWVILLE, N. Y.—Arrangements have been perfected with the Black River Telephone Company for a line to Harrisburg via Hamblin's Corners and the West road, and a number of the residents along the line will be connected with the Lowville exchange.

BARLOW, OHIO.—The Barlow Telephone Company is rebuilding its line, putting in new telephones and poles and extending north of Barlow.

CRESTLINE, OHIO.—The Crestline Telephone Company is making extensive improvements in its plant and will soon be ready to mave to its new quarters.

FINDLAY, OHIO.—The Farmers' Mutual Telephone Company held a meeting at the schoolhouse in District No. 9 recently for the purpose of extending the line from Jasper Dukes to Benton. Officers were elected as follows: President, G. M. Driesbach; secretary, David Moffit; treasurer, S. W. Boyer.

SPRINGFIELD, OHIO.—The plant of the Springfield and Xenia Telephone Company is to be finished and in operation within the next six months. Former Governor A. S. Bushnell has taken hold of the project and has purchased the Mendelbaum interests. Mr. Bushnell says he has secured Messrs. Barber and Brailey, of Toledo, to construct the system. About 600 more poles will be erected and a new telephone exchange building will be constructed. As soon as possible these men will begin upon the completion of the plant. Among those interested in the company are: E. L. Barber, J. F. McGrew, S. F. McGrew, R. R. Mills, P. E. Montanus, E. C. Juvenal and James Dryfoss.

STEUBENVILLE, OHIO.—Superintendent J. W. Preble, of the Phœnix Telephone Company, says the demand for telephones is such that the company will be compelled to order a new and larger switchboard or make an addition to the present one.

WOOSTER, OHIO.—The work of installing the large new switchboard at the local exchange of the Millersburg, Wooster and Orrville Telephone Company is progressing rapidly.

COCHRANTON, PA.—The Cochranton Telephone Company, which was organized one year ago by John H. Wright, of Spartansburg, Pa., has declared an annual dividend of eight per cent. The company will build a number of rural lines in the spring and also a line to Meadville, the county seat, to connect with the Independent Company of that city. Mr. Wright, of Spartansburg, and David Berringer, of Cochranton, are the managers of the company.

MONTROSE, PA.—The People's Telephone Company, of this place, will connect with the company's lines at Meshoppen, and thus open communication to Wilkes-Barre and other important points. Dr. J. F. Butterfield, of South Montrose, and C. L. Stone, of this place, have made arrangements for constructing the line.

PITTSBURG, PA.—At the annual meeting of the Pittsburg and Allegheny Telephone Company it was decided to spend almost $1,000,000 for improving the service in Allegheny county. The reports received of the workings of tne system were gratifying. The lines will be extended throughout the county. The following directors were elected: D. E. Evans, Stanley Baker, of Baltimore; S. H. Browne, John A. Wilson, Theodore White, George R. Webb, of Baltimore, and E. B. Bouton. The directors re-elected the old officers.

MARSHALL, TEX.—F. M. Marriott, vice-president of the Harrison Construction Company, of Cincinnati, Ohio, is here in the interest of his company, which expects to start building a telephone line here.

SPENCER, W. VA.—M. T. R. Simmons has been granted the right to build a telephone line from Spencer to Looneyville by the County Court.

MISCELLANEOUS

ROCK ISLAND, ILL.—The Union Electric Telephone and Telegraph Company has opened tri-city communication between Rock Island and Moline, Ill., and Davenport, Iowa, with over 2,000 telephones in operation. Several hundred more have been installed and are being put in, but are not yet connected. Communication has also been opened with over 400 towns in Iowa, Illinois and Missouri. Alfred Slater, of Janesville, Wis., has assumed the general managership and William P. Sanger, of Philadelphia, auditor, with F. C. Welsh, of Rock Island, as cashier.

BLOOMFIELD, IND.—John F. Slinkard, of this city, and John Davidson, of Lyons, are endeavoring to effect a reorganization of the Home Telephone Company so as to enlarge the system, take in about every post-office and farm in Greene county and reincorporate with a capital of $100,000.

THE WEEK'S MESSAGES—Concluded.

LAFAYETTE, IND.—The Lafayette and Clarkshill telephone companies have signed an agreement under which farmers east and south of Lafayette will have free connection with all telephones in the city.

LAFAYETTE, IND.—Elmer Waters, secretary of the South Raub Co-operative Telephone Company, is in the city to confer with Henry A. Taylor, president of the Lafayette Telephone Company in regard to interchange of traffic.

OSCEOLA, NEB.—The Golden Rock Telephone Company has completed its system in Osceola.

GLOVERSVILLE, N. Y.—Fire has destroyed the building occupied by the Glen Telephone Company in Johnstown. Loss, between $15,000 and $20,000, which is practically covered by insurance.

SPEARFISH, S. D.—An exchange has been established in Spearfish by the Black Hills Telephone Company, with 100 subscribers. Both the Black Hills and Harrison companies now have exchanges here.

PERSONAL

ATLANTA, GA.—F. V. L. Turner, general manager of the Standard Telephone, with headquarters in Atlanta, has resigned his position. Mr. Turner's resignation was due to his acceptance of the position of general manager of the Federal Telephone Company, of Cleveland, Ohio.

LA GRANGE, IND.—W. H. Winship has been selected as manager of the Northern Indiana and Southern Michigan Telegraph, Telephone and Cable Company. He will have charge of the ten exchanges, with headquarters in La Grange.

THREE RIVERS, MICH.—The Citizens' Telephone Company has gone under the management of M. Lott, who assumes the place made vacant by the resignation of Earl Shafer. who will take a position with the Stromberg Carlson Telephone Manufacturing Company, of Chicago, as traveling salesman for Indiana. The Citizens' Company began business in May, 1897, and for four years were met by the most determined opposition from the Bell people, the latter company going so far as to reduce their rates from $48 for commercial and $24 for houses down to $12 and $6, and for about a year it was a matter of life or death for the home company. The Citizens' Company throughout maintained the rates first established and finally the Bell people again raised their rates, with the result that a great many of their subscribers left them, until to-day they are comparatively an unknown quantity in this city, as compared with the Citizens, who to-day have nearly 400 subscribers and are putting in additional telephones every day.

SUNBURY, PA.—J. F. Mackert, of this city, has been appointed manager of the Lewisburg division of the United Telephone Company.

PHILADELPHIA BELL HAS TROUBLES

ABOUT 12,000 suits are threatened against the Bell Telephone Company, of Philadelphia, as the result of a decision rendered in court recently. In the suit of John Rogers, president of the Philadelphia Baseball Club, a verdict of $55.35 was obtained for rebates on charges made for unused local calls on the telephone in Mr. Rogers' office. William H. Hepburn, counsel for the plaintiff, states that 12,000 suits will be brought up if the verdict is sustained by the higher courts.

TRADE NOTES

The Chicago, Union Pacific & Northwestern Line runs three solid through trains daily from Chicago to California.

The Kellogg Switchboard & Supply Company, Chicago, has taken a contract for telephones and other supplies to be shipped to Honolulu, Hawaii.

The Standard Vitrified Conduit Company, New York, has just issued a little booklet which it calls "Conduit Comments." It is very tastefully gotten up. Particular attention is given to illustrating the dowel pin lock joint, the recent invention of Mr. R. W. Lyle, the president and general manager of the company.

The Stromberg-Carlson Telephone Manufacturing Company has recently sold material to the following companies: The Calhoun County Telephone Company, of Kampsville, Ill.; The Kilbourne Telephone Company, of Kilbourne, Ill.; the Shelby County Mutual Telephone Company, of Strasburg, Ill., telephones and switchboards; the Secor Telephone Company, of Secor, Ill.; the Danforth Telephone Company, of Danforth, Ill., telephones and other material

The Acme Electric Company, Chicago, has issued a new catalogue illustrating and describing its line of telephone instruments, switchboards, ringers, coils, etc. There are several bright and catchy aphorisms in the catalogue, a few of which read as follows:

"The individual who gets into the habit of giving way to depression is on the broad road to ruin."

"A man seldom realizes how few of his remarks are worth repeating until he has conversed with a deaf person."

"The man who leaves church just as the collection plate starts around may have been taken suddenly ill, but he rarely gets credit for it."

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

WANTED—300 drops or less, second hand American Express Metallic Circuit Drop. Address DROP, care American Telephone Journal, 1263 Monadnock Block, Chicago.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

POSITION as superintendent or manager of telephone company. Eight years' experience in managing and building exchanges and toll lines. At present superintendent of construction, large Independent company. Best of references. Will be open for position after April 1st. Address Lock BOX 11, RECTOR, ARKANSAS.

POSITION as wire chief in exchange of from 500 to 1,500 telephones, or as manager of small exchange. Five years' experience and best of references. Address J. H. W., care of the American Telephone Journal.

WIRE chief, formerly in charge Bell exchange, 3,000 lines, New York, wants position as manager of 500 to 1,000 subscriber exchange. References. Address E. F. L., care The American Telephone Journal, N. Y.

POSITION as manager and engineer in exchange of 2,000 lines or less. Formerly wire chief in Bell exchange, N. Y., 3,600 lines. Address H. J. S., care American Telephone Journal, N. Y.

AN ASSISTANT MANAGER from a large New York City (Bell) Exchange and competent Traffic Manager desires position away from New York City as manager or superintendent. Address "EX-BELL," care American Telephone Journal, New York.

WANTED, position as manager or assistant of an exchange of 200 to 500 subscribers. Several years' experience; can give good references. Address J. E. Thurston, North Vernon, Indiana.

TELEPHONE SALESMAN wanted by prominent manufacturer; only those with experience on the road need apply; state salary, references and give full particulars. Address BOX 37, care American Telephone Journal, New York.

POSITION as Superintendent constructing and equipping exchanges and farmer systems. First class work guaranteed. Moderate salary. References. Address G. N. CARTER, Alexandria, Indiana.

The American Telephone Journal

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ADVANCED ENGINEERING PRACTICES IN THE CONSTRUCTION OF THE LOS ANGELES, CAL., HOME TELEPHONE COMPANY

By P. Kerr Higgins.

A DESCRIPTION of some modern methods used in building the new plant of the Home Telephone Company, Los Angeles, Cal., may prove interesting to those contemplating such work. The switchboard is one of the largest single multiple boards in the world, designed for an ultimate capacity of 18,000 lines, with a strong possibility that five-sixths of its capacity will be placed in use from the start. The board was made by the Kellogg Switchboard and Supply Company, of Chicago.

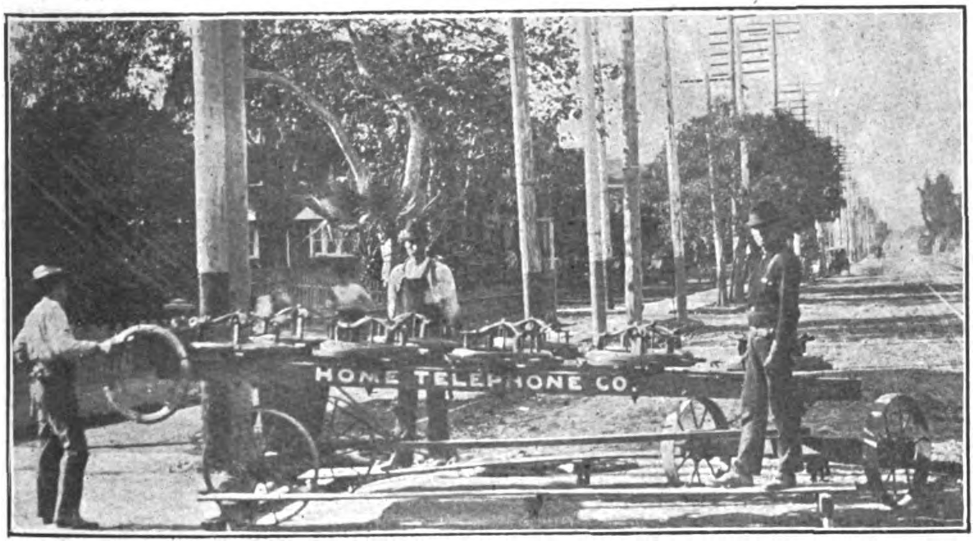
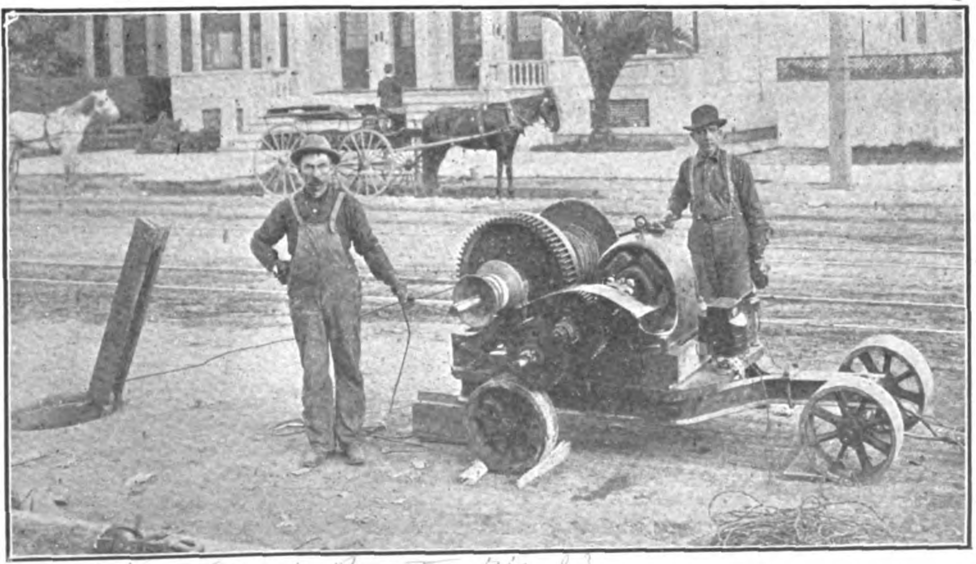


FIG. 8.—TEN REEL WAGON.

One novel feature is the shape of the desk of the subscribers operators' position, which is trough shaped, the lean being made toward the board. All the supervisory lamps are protected with individual screens.

The wire plant exhibits the following prominent features: 1, large poles; 2, erecting (or stringing) ten pair of wires at one time; 3, the use of double pin cross-arms; 4, manner of wiring cable boxes; 5, concealed work in all large buildings, to attic or basement as may be necessary, instead of using moulding; 6, the use of a derrick wagon for setting or removing poles; 7, electric motor for pulling in or erecting cable.

Because of the poor line construction (lack of uniformity) of the existing company it was necessary to erect high poles, and, although more expensive, the result makes very fine construction as seen in Fig. 3. In order to expedite building, a wagon fitted up with ten reels is used, making it possible to string ten lines at a time (Fig. 8). The use of pins on both sides of the cross-arm (allowing ten inches clear between all wires) is very serviceable in this climate and much superior to porcelain knobs.



Tel. Line Const. Part III Fig. 23

FIG. 4.—MOTOR CAPSTAN.

The engineering department of the Home Telephone Company is under the direction of Chas. E. Zahm, of Fostoria, Ohio. Prior to coming here he was engineer of the Home Telephone Company, of Toledo, Ohio. He might be termed a comparatively new engineer, yet he has outpaced many who have been in the telephone business for a much longer period, because he has concentrated all his efforts to acquiring the latest ideas, and so is thoroughly up to date.

Some of the modern methods used by Mr. Zahm may be interesting to those not already familiar with them.

MANNER OF WIRING CABLE-BOXES.

Two methods have been put in use: 1. A straight box. 2. A distribution box. The "straight box" is shown in Fig. 1 and is intended to cover or be used at a point where the underground and the aerial lines meet and where there is no immediate prospect of any branch cables. A standard strip is used, mounted and numbered for 25, 50, 100 or 150 pair, as may be found necessary (all main cables in ducts are 300 pairs). The incoming and outgoing cables are laced and soldered in the usual manner. The distribution is accomplished by using the old-time cross-connection as shown in Fig. 2. The main cable comes in on one side and the house wires on the other, laced up in the usual way. In the centre, between the two standard strips, three bridle-rings are placed as shown and the cross-connections made in the usual way. This is a very flexible method and in many cases accomplishes the same results as are obtained by "looping in" a

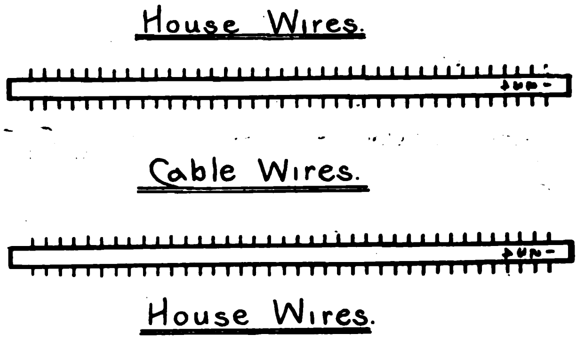


FIG. 1.—STRAIGHT BOX.

cable. The box always looks neat and there is no necessity f "jumpers."

"FISHING" WIRES.

Careless workmen frequently run wires for a desk telephone under a carpet, or sometiemes on the floor if there is no carpet, using twisted conductors for this work, and it is only a question of time before trouble ensues.

The Home Company has taken a firm stand against poor work by compelling all wiring to be concealed wherever possible. Also it has, whenever possible, run a complete set of wires for its own use, irrespective of whether the building was wired by the Bell Company or not. This avoids friction and enables it to supply all demands.

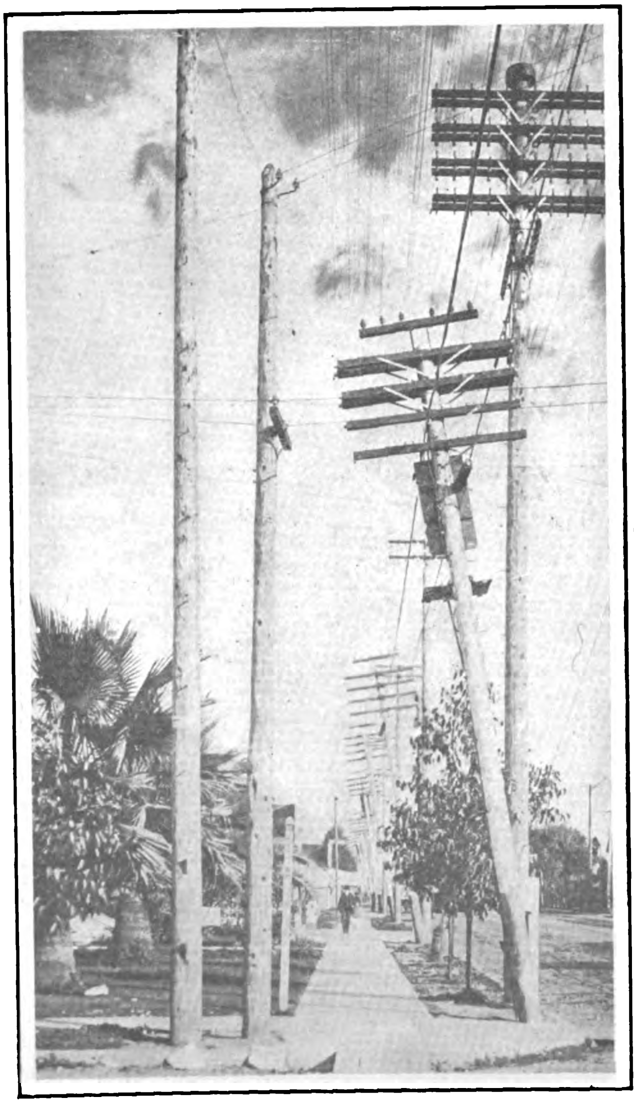


FIG. 3.—POLE LINE CONSTRUCTION.

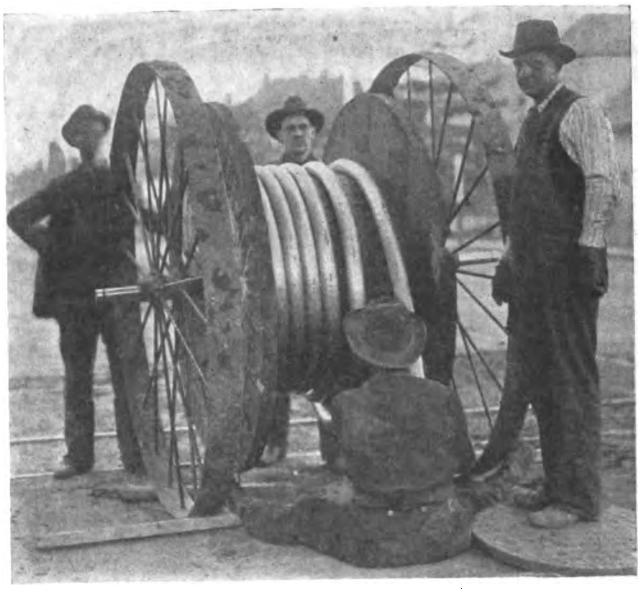


FIG. 7.—CABLE REEL MOUNTED ON CAR.

THE DERRICK WAGON.

The derrick wagon is quite new in this part of the country and has proved its worth by enabling a few men to handle poles in a remarkable manner. The Bell Company still uses the old

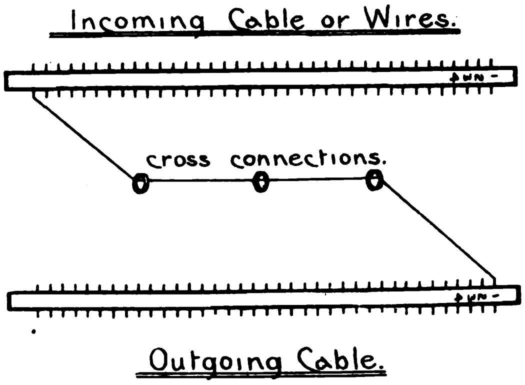


FIG. 2.—CROSS-CONNECTING BOX.

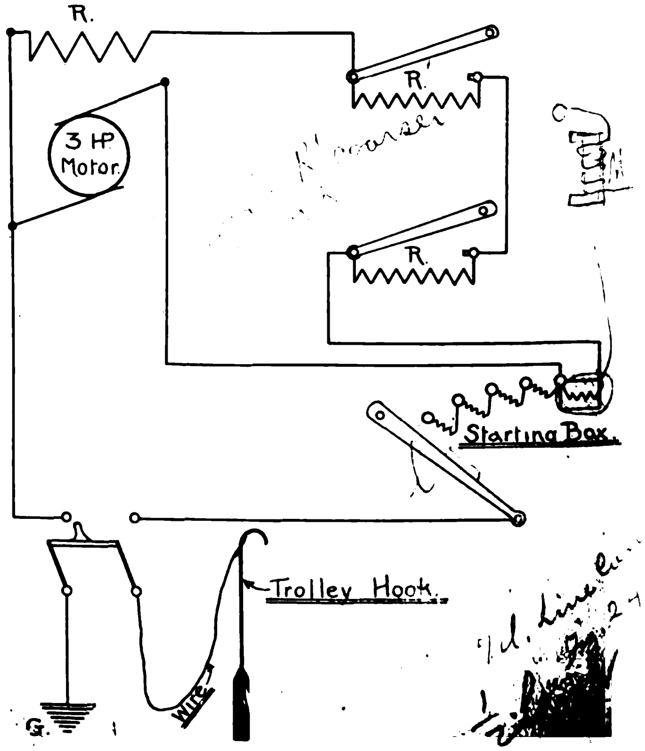


FIG. 5.—CONNECTIONS OF CABLE MOTOR.

method of setting poles by means of ladders, deadmen and pike poles.

MOTOR CAPSTAN.

The motor capstan is probably one of the latest and best methods of pulling in or erecting cable and the photograph shown in Fig. 4 gives a good front view, while Fig. 5 is a diagram of the circuit. The machine is quite simple to operate and takes but fifteen minutes to set up. Fig. 6 shows the method of arranging the cable rope. There is no jerk on the cable and pulling can be stopped in an inch, by allowing the cable rope to slip on the drum (there being five turns of the rope on the drum) while the free end is held in the hand. Power (500 volts) for driving the motor is obtained from the trolley and the cost for a month's pulling averaging 5,000 feet per working day was but two dollars ($2.00), only a nominal sum compared with the labor saving. The cable pulled on a *full* working day was 9,000 feet as compared with 1,000 feet by the old hand capstan method. Six men are necessary for drawing cables. They are arranged as follows: One man on "sand line," one man in each man hole, three men on the reel. The pulling rope used is ⅜-inch steel strand made with a soft core. The largest cable is 300 pair, having a diameter of 2⅝-inches placed in a 3-inch duct. The motor has five speeds. The cable reels are mounted on a cable car shown in Fig. 7, and are raised up by means of two "skids," enabling the cable reel to be handled with great ease and rapidity.

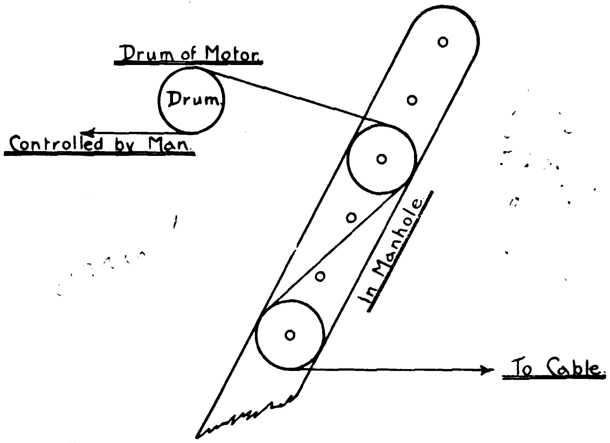


FIG. 6.—METHOD OF ARRANGING CABLE ROPE.

ANNUAL CONVENTION OF THE MICHIGAN INDEPENDENT ASSOCIATION

REPRESENTATIVES of over seventy Independent telephone companies of Michigan attended the annual convention of the Michigan Independent Telephone Association in Lansing, Mich., on Thursday, February 26. The meeting was to have been held in the convention hall of the Hudson House, but when the delegates were all assembled it was seen that the hall was entirely inadequate, so an adjournment was taken to the Council Chambers in the City Hall.

President J. B. Ware called the meeting to order and delivered his annual address, which in part read as follows:

PRESIDENT WARE'S ADDRESS.

During the year past, marked differences have been noticed from time to time, as to the condition of the Independent companies and the Bell company in this state.

The former have continued to increase in number of telephones and in favor with the people; dividends have been paid with the same regularity which has been the rule in the past and as in the preceding years, financial remisses have not overtaken any of the companies.

With the Michigan Bell Company, continued error in policy has been pursued as in the past. On July 1st, interest was defaulted on the $5,000,000 of bonded debt, and on August 1st the same occurred as to the $595,000 of bonds of the Detroit Telephone Company which were guaranteed by the Michigan Bell at the time of the sale to that company three years ago, together with certain telephone properties by about a dozen citizens of Detroit and Kalamazoo who thought more of a quick profit, than they did of business honor or loyalty to business associates.

Since July 1st, 1902, officers of the Michigan Bell Company have expended large sums of money in trying to improve the company's property and system, which money belonged rightfully to the company's bond holders. That such expenditure was warranted is very doubtful; that the standing of the company with the people of the state has not been improved seems unquestioned, and the appointment of the Union Trust Company, of Detroit, as receiver, on February 24th, is the long expected outcome as the only natural result of the Bell policy.

This is the first Bell company to go into the receiver's hands. Several others have long ceased to pay dividends and have had great struggles to keep up interest payments, and it seems fair to anticipate other Bell companies may travel the same road that has the Michigan Bell Company.

While this will not cause surprise to many active telephone men who have known the blunders and errors of the parent and licensee Bell companies, yet it is extremely unfortunate that large telephone interests should be financial failures, when, for the first time, capital can be invested in Independent companies without fear of patent troubles or risk of litigation.

If the people in the East, understood as do the people in Michigan, that the Bell companies no longer have apparatus superior to that used by opposition companies and that Bell licensees cannot furnish service as cheaply as can their opponents, owing to Bell royalties, to larger general expenses; to overcapitalization; to inferior construction with which to compete with modern and improved construction, and apparatus;—if these matters were understood, every Bell company failure would make those money interests that are not tied up to Bell securities, more active in supporting Independent interests, than they will be inclined to do when the facts are not properly known.

That the East has awakened somewhat to the situation and the advantages gained through the Independent movement, is perhaps as clearly indicated by the recent rapid development in the state of New York as in any case that can be cited.

Although unable to give a complete list of cities in which Independent exchanges have been built in that state during the last year, the following are among such cities and towns:

Buffalo, Binghamton, Troy, Penn Yan, Hornellsville, Utica, Jamestown, Medina, Watkins, Cohoes, Waterloo, Olean, Oneonta, Albany, Geneva, Corning, Newburgh, Salamanca, Batavia, Ithaca, Saratoga, Newark, Seneca Falls, Dunkirk, Schenectady, Canandaigua, Elmira, Poughkeepsie, Wellsvile.

With scarcely any exceptions, these exchanges are of the central energy type, much cable distribution and the construction unsurpassed anywhere.

These, and other cities built previously (such as Rochester, Syracuse, Niagara Falls, Rome, Herkimer, etc.), are being connected by long distance lines now about completed some using 30-foot 8-inch top poles, 40 to the mile; with No. 10 copper circuits, and plenty of them.

Thus New York State, which has to-day nearly 50,000 Independent telephones in operation, will, before January 1st next, probably have very close to 100,000 Independent telephones; and the Independent interests will occupy practically every city, town and village, except New York City, in which, I believe, an Independent exchange is inevitable.

The East is thus awakening, and it is not an idle dream to perceive in the near future, a long distance service and telephone development that will be adequate to the demands of the nation's citizens, as the culmination and outgrowth of the Independents in many states, prominent among which are many Michigan men.

While the most important event, during the year, has been the final decision in the Berliner patent suit, and a sweeping defeat to the Bell company, yet such was the Bell influence on the Associated Press, that the merest mention was made of the decision, other than in the electrical magazines.

With patent litigation ended, as far as broad basic patents are concerned, we may well consider the first period in modern telephone history as ended.

The problems arising from time to time have been honestly met and solved. The ability of the people to furnish themselves with better telephone service and at less expense, than could be done by a monopoly, has been demonstrated and recently has been proven the legal right of the people of the United States to develop this great necessary business factor and public convenience to all classes. What magnitude such development will reach, probably cannot to-day be comprehended. Some years ago, other than those owned by the Bell companies, there was not an exchange of 500 or more telephones in operation and less than a score with a hundred instruments in operation.

In several states, the Independents have more exchanges, telephones and toll circuits and mileage than have the Bell companies. From sources believed to be reliable, are obtained figures from which we make from three states, the following companisons as to telephones in service:

State.	Bell.	Independent
Ohio	86,000	121,000
Indiana	32,000	78,000
Kansas	11,000	39,000
Total	129,000	238,000

While other states could be named where similar conditions exist, accurate figures are not at my command. Thus in five years, the people for themselves have accomplished more in the development of the telephone benefits, and the business itself, than have all the Bell companies during the last twenty years of their existence.

Perhaps the future has greater problems in store for us than we suspect. We do, however, feel safe in planning for a greater development with the very best service possible for all subscribers, whether in cities, villages or rural communities.

This means larger investments and reconstruction in some instances. Because of these conditions and others, there will necessarily be changes in rates in certain exchanges, where the rates were established for smaller exchanges and with inferior construction.

As a rule, however, in place of a change of rates, will come a more perfect systematizing of the business and a closer study and application of telephone economics, with the result of, perhaps not reducing the expenses of operation (which I believe can and will be accomplished, however) so much as the increasing of the volume of business. Special services are needed by our patrons not heretofore given, which will, not alone benefit ourselves, but secure to us even greater public favor. So great has been the struggle to care for the business offered us, we have had little time for the consideration of many questions that have arisen.

The time has arrived, however, for such consideration, and I confidently look for solutions of problems of depreciation and operation without, as a rule, resorting to a rate charge.

Especially is this to be the case in the toll line business, where, with more economy of time in handling messages, less expensive record keeping and manner of settlements, and the securing of additional circuits, and facilities at nominal expense, and affording thereby a wonderful increase in business and income; all these and others will make our next five years as progressive and satisfactory to ourselves and to the public, as has been the last five years.

At this point it is well perhaps to consider briefly, the Detroit situation and a few of the facts connected with the history of Detroit misfortune.

In 1894, Mr. R. E. Brett undertook to establish an Independent company in Detroit. A canvass of the city resulted in securing over 3,000 telephone contracts at these rates: Business, $50; physicians, $40; residence, $30. The Bell rates were $120 and upwards for long distance telephones; and $72 and upwards for Blake telephones, with less than 2,500 telephones in service.

The rates proposed by Mr. Brett were great reductions, yet when the franchise was desired, its rates were opposed by Bell influences and by physicians—the latter being a class that receive all business over the telephone and yet is frequently least willing to pay reasonable rates for telephones of any class.

Mr. Charles Flowers was retained by Mr. Brett as attorney, but was unable to prevent great delay on the part of the council in acting on the franchise, or to prevent the rate being made $40 for business and $25 for residence—rates which Mr. Brett claimed were too low and which were adopted by certain members of the council in order to kill the franchise, so I understand.

When the franchise finally passed, December 4, 1894, with the rates of $25 and $40, it was refused by Mr. Brett who abandoned his efforts. Then it was that Mr. Flowers undertook to secure a franchise at the low rates named and on March 14, 1895, did obtain such franchise for the Detroit Telephone Company.

In view of the character of construction of the plant and the small investment in connection therewith, it is scarcely a question that the plant would have proven profitable if properly handled. Several things indicate that it was not the intention of Mr. Flowers and his associates to operate the plant, one of which is that for a period of at least five months after the toll lines were connected with the Detroit exchange, bills for state line service had not been made against subscribers. At the time of the sale of the Detroit exchange, there was over $25,000 owing by subscribers for rentals and tolls.

The plant had been built by a bond issue, so that the few gentlemen who held the control of the stock had little invested in it.

Their New State Company was making money as was the Kalamazoo properties when sold, so that the fact remains with all allowances, that it was not because the investments were bad ones that a dozen men sold out these properties against the wish of hundreds of stockholders, but because these few were without ordinary business honor, and probably did only what was originally planned. The Detroit Company never attempted to secure a franchise amendment as to rates. Mr. Flowers claimed a telephone franchise to be absolutely worthless, and yet in the interest of the Bell company, has opposed a franchise at rates that would enable the installation of a successful Independent company.

PAPERS ARE READ AND DISCUSSED.

Thomas Bromley, of Muncie, Ind., was to have read a paper on "The Indiana Independent Situation," but at the last moment telegraphed that he would be unable to attend.

R. F. Johnson, general manager of the Valley Telephone Company, of Saginaw, Mich., then read a paper on "Clearing House." He gave a comprehensive presentation of the problems of toll business and the advantages of the clearing house, his paper being in the nature of an agreement to be signed by the various connecting toll lines, and giving a constitution and by-laws. It is a model of clearness, and will be printed in the next issue of The American Telephone Journal.

This paper was referred to a committee of five, consisting of E. B. Fisher, secretary Citizens' Telephone Company, Grand Rapids; R. F. Johnson, Saginaw; J. H. Fildew, manager Union Telephone Company, Alma; W. O. Hunt, manager Adrian Telephone Company, Adrian, and R. B. McPherson, Livingston Home Telephone Company, of Howell, Mich. This committee was given full power to act on Mr. Johnson's paper.

Messrs. Fisher, of Grand Rapids, and Fildew, of Alma, discussed the matter of clearing houses before the convention in detail.

At this point an adjournment was taken until 2 P. M.

The afternoon session was opened by a carefully prepared paper by C. E. Tarte, general manager of the Citizens' Telephone Company, of Grand Rapids, on "Night Rates and Three-Minute Service." It was intended that this paper be discussed by H. H. Robinson, traffic manager of the United States Telephone Company, of Cleveland, but he was unavoidably absent. The paper, however, brought out a warm discussion, which was participated in by practically all present. The paper is printed on another page, and will repay careful study.

Dr. Root, of Hart, thought the night business was greater between the hours of 6 and 8 P. M. and 6 and 7 A. M., and therefore it would be better in case night rates were made to have them apply to the hours between 8 P. M. and 6 A. M. As to a three-minute rate, he thought it was not practicable, as too much time was taken by the identification of the conversing parties.

To this Mr. Tarte replied that by actual tabulation he had found that, while the hours of 7 to 8 P. M. represented the busiest part of the night service, yet this did not compare with the service between 5 and 2 P. M.

H. A. Douglas, manager of the Citizens' Telephone Company, Jackson, concurred with Mr. Tarte's views of the three-minute service, but went further and recommended a one-minute rate, which was the rule with the opposition company in Mr. Douglas' field.

Mr. Fisher, of Grand Rapids, said he believed that the Michigan Independents gave a lower toll rate than in any other state, it being based on the county rate of 10 cents and an inter-county rate of one-half cent per mile, whereas in Indiana the county rate was 15 cents and the inter-county rate 25 cents, even were the two towns just across the dividing line and but ten miles apart.

Others who partook in this discussion thought the night rate should be extended to Saturday business, and the discussion wound up by Mr. McElvaine, of Hastings, moving that the matter be referred to the same committee of five that was to handle Mr. Johnson's paper on "Clearing House," which was carried.

A paper on "The Necessity of Independent Connection to Detroit Business Men" was read by Stanley Parkhill, of Owosso. It will be printed in our next issue, and was a strong, forceful argument showing the advantages the Detroit business men would receive should they establish an Independent exchange, and telling of the disadvantages they labored under through having only the Bell telephones. Mr. Parkhill is himself a practical business man, and his paper should carry much weight in any further efforts by Independents to secure a foothold in Detroit. Mr. McPherson, of Howell, ably discussed this paper.

H. E. Adams, of the W. G. Nagel Electric Company, Toledo, O., next read a paper on "The Toledo Exchange," in which he detailed the history of the Independent movement in Toledo, and showed that the new home exchange was eminently successful. This paper will be printed next week.

W. O. Hunt, vice-president and general manager of the Adrian Telephone Company, spoke extemporaneously on rural telephone connections. Messrs. Douglas, of Jackson, and Wing, of Grass Lake, and others, ably discussed this important subject.

Mr. Wing called the attention of the association to the fact that they had been entirely too slow in making farm line connections, and on going into details practically every delegate present agreed with his views. He cited the fact that the farmers were determined to have telephone connection; that if Independents failed to give them this service the Bell would, and, failing both, the farmers would build their own lines. Every one was agreed on the desirability of the farmer line business, but admitted the difficulty of first making the arrangements for such service. Discussion along these lines developed the fact that the Michigan Bell Company was after this class of business and was doing its level best to gain it. One instance was brought out where the Bell had leased telephones for $7 a year to a body of farmers who had built their own lines, and made only an additional charge of 10 cents for each town connection and the regular tolls to points beyond.

Mr. Fisher, of Grand Rapids, recommended that the initiation fee to the association be $1 and that annual dues be based as follows: Two hundred telephones or less, $1; from 200 to 500 telephones, $5; 500 to 1,000, $7.50; 1,000 to 2,000, $15; 2,000 to 5,000, $25; 5,000 to 10,000, $35, and over 10,000, $50.

This latter figure at present applies only to Mr. Fisher's company, which has about 14,000 telephones in operation.

At this point the treasurer's report was read, and showed a healthy financial condition of the association.

J. B. Ware, who has recently become interested in New York State Independent interests, tendered his resignation in the association, which was accepted. The association voted Mr. Ware hearty thanks for his untiring efforts in its behalf during his several years of service. E. B. Fisher, of Grand Rapids, was then elected president, the other officers being re-elected, so that the officers of the association now stand as follows: E. B. Fisher, Grand Rapids, president; R. F. Johnson, Saginaw, treasurer; C. F. Brown, Alma, secretary. The executive board was changed only by the election of William Robinson, of Muskegon, in Mr. Ware's place.

The meeting then adjourned, leaving the time and place of the next meeting to the discretion of the executive board.

From the standpoint of attendance and interest this was the most successful meeting of the Michigan Association. A steady improvement in Michigan affairs has been going on, and in view of the fact that the Michigan Bell Telephone Company last week went into the hands of a receiver, the Independent prospects were never brighter.

OPERATORS AND MANUFACTURERS PRESENT AT THE CONVENTION

AMONG those present at the convention were the following: F. E. Backus, Livingston Home Telephone Company, Howell; John H. Tripp, Kibbie Telephone Company, Kibbie; E. B. Fisher, Citizens' Telephone Company, Grand Rapids; H. A. Douglas, Citizens' Telephone Company, Jackson; John Rentz, Blissfield Telephone Company, Blissfield; F. C. Hughes, Citizens' Telephone Company, Lansing; W. S. Vivian, Citizens' Telephone Company, Lansing; C. E. Tarte, Citizens' Telephone Company, Grand Rapids; F. E. Cole, Citizens' Telephone Company, Ionia; W. O. Hunt, Adrian Telephone Company, Adrian; F. S. Phillips, Ogden; C. W. Cook, Rives Junction; E. B. Lee, Weston; E. G. Stacey, Twin City Telephone Company, Benton Harbor; F. G. Howard, Grand Rapids; J. E. McElvain, Hastings; J. C. Furniss, Nashville; C. H. LaFlamboy, Union Telephone Company, Alma; R. F. Johnson, Valley Telephone Company, Saginaw; J. B. Ware, Detroit; C. F. Brown, Union Telephone Company, Alma; George G. Root, G. P. Hyde, H. S. Newton and George A. Hawley, of the Oceana Telephone Company, Hart; A. A. Burch, Citizens' Telephone Company, Greenville; Geo. F. Statemeyer, Calhoun County Telephone Company, Battle Creek; A. Stacey, Citizens' Telephone Company, Grand Rapids; S. E. Harmer, Citizens' Telephone Company, Coopersville; John W. Perkins, Oceana Telephone Company; G. H. Weed, Citizens' Telephone Company, Lake Odessa; C. T. Babcock, Union Telephone Company, St. Johns; Stanley E. Parkhill, Union Telephone Company, Owasso; William Robinson, Citizens' Telephone Company, Muskegon; W. H. Orr, Citizens' Telephone Company, Holland; D. H. Owen, Citizens' Telephone Company, Lowell; Frank M. Howard, Valley Telephone Company, Flint; John H. Fildew, Union Telephone Company, Alma; F. F. Helbesh, Woodland; A. A. Cowles, Co-Operative Telephone Company, Detroit; J. E. Hisey, 'Phone Exchange, Lansburg; J. B. Lockwood, Citizens' Telephone Company, Lansing; C. E. Smith, Citizens' Telephone Company, Vermontville; D. John Berry, Citizens' Telephone Company, Kalamazoo; W. E. Baum, Mutual Telephone Company, Springport; J. H. Palmer, Sunfield Telephone Exchange, Sunfield; P. M. Kent, Sunfield Telephone Company, Sunfield; Edgar Daykin, Deerfield Telephone Company, Deerfield; Nelman F. Wing, Farmers' Telephone Company, Grass Lake; W. H. Graves, Leslie Telephone Exchange, Leslie; R. B. McPherson and O. I. Parker, Livingston Home Telephone Company; F. N. Monroe, Williamston; Dr. J. C. Buell, Rives Junction; George A. Hawley, Oceana Telephone Company, Hart; John M. Fuller, Union Telephone Company of Alma, Henrietta; A. J. Curtiss, Citizens' Telephone Company, Kalamazoo; C. E. Marsh, Valley Telephone Company, Saginaw; B. L. Carson, Valley Telephone Company, Bay City.

MANUFACTURERS AND SUPPLY MEN PRESENT.

There were quite a number of telephone manufacturers and supply men present at the convention, including the following:

The F. Bissell Company, Toledo, O., M. S. Walker.

Kellogg Switchboard and Supply Company, Chicago, Ill., R. S. Mueller.

Stromberg-Carlson Telephone Manufacturing Company, Chicago, Ill., and Rochester, N. Y., A. B. Smith.

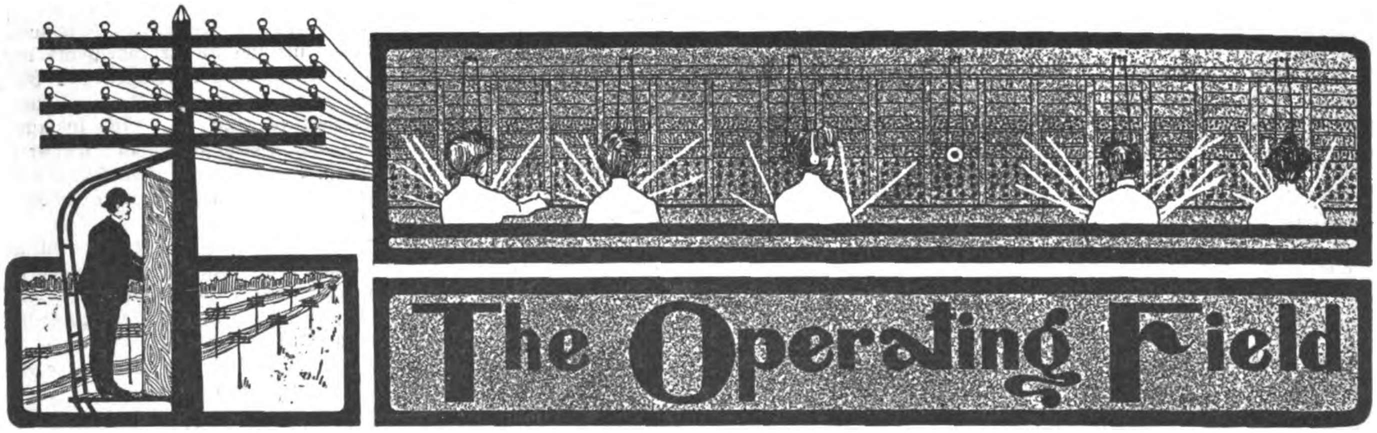
W. G. Nagel Electric Company, Toledo, O., H. E. Adams and J. B. Darragh.

Illinois Electric Company, Chicago, Ill., C. J. Litscher.

John A. Roeblings Sons' Company, Chicago, Ill., R. B. Abbott.

The Chicago Telephone Holder Company, Chicago, Ill., F. W. Pardee, general manager.

THE AMERICAN TELEPHONE JOURNAL was represented by its Western manager, Elmer E. Smith, it being the only trade paper at the convention.



IOWA TELEPHONE ASSOCIATION MEETING.

THE Independent Telephone Association of Iowa will hold a convention in Des Moines Tuesday and Wednesday, March 10 and 11, at the Savery Hotel.

An effort will be made to change the system of dividing tolls for messages which pass through the lines of several companies.

At present when one company transmits a message to the lines of another and it does not pass to a third, the company on whose lines the message originated gets 60 per cent. of the charge and the second company 40 per cent.

When the message passes over the lines of three companies, the first gets 50 per cent. and the other two 25 per cent. each.

When the message passes over the lines of four companies, the first gets 40 per cent. and each of the others 20 per cent.

This method of dividing the tolls has been in use among the Independent lines in the association ever since its organization five or six years ago. Some of the most prominent men in the different companies believe that it should be changed.

The proposition will be that the tolls be distributed to companies in proportion to mileage.

There are now about 300 members of the Iowa Telephone Association and about 800 companies in Iowa. Officers of the association believe that the membership will be largely increased at the meeting to be held next week. This is the seventh annual meeting of the Association.

U. S. Alderman, of Nevada, is president, Henry S. Herr, of Ottumwa, is vice-president, Charles C. Deering, of the Mutual Telephone Company, of Des Moines, is secretary. Mr. Deering has just issued the notices of the meeting. The programme has not yet been arranged.

Charles Kirk, of Charlton; George N. Bandy, of Des Moines; J. S. Bellamy, of Knoxville, and H. C. Raney, of Fairfield, are the members of the executive committee.

The effect of the recent supreme court decision on the telephone business will be discussed by the Association at this meeting and probably definite action will be taken with respect to the policy of the Independent companies on the proposition which will come before the next general assembly to enact a law giving cities the power to fix telephone rentals.

ANOTHER LEGAL OPINION ON CUYAHOGA RIGHTS.

THE following is the opinion of Blandin, Rice & Ginn as to the legal right of the Cuyahoga Telephone Company of Cleveland, Ohio, to raise its rates for service.

By the provisions of sections 3454 and 3471 of the Revised Statutes of Ohio, any company organized to construct a line of telephones in this state was authorized to construct the same on and along any public road within the state, by the erection of the necessary fixtures, posts, piers, wires, etc., therefor. By the provisions of 3461 of the Revised Statutes, the "mode of use" of the streets, alleys and public ways of the city, when used by a telephone company for the erection of its telephone lines, might be determined by agreement between the city and the telephone company, and if not agreed upon between them the mode of use might be determined by application to the probate court of the proper county.

These are the substantial provisions of the statutes of the state, bearing upon the question involved.

By sections 3454 and 3471 above referred to, the state has expressly conferred upon telephone companies the right to occupy the streets and highways of the state for the purpose of erecting and maintaining its lines, and this authority to the telephone company to occupy the highways for the erection and maintenance of telephone lines is not limited by statute except by the provisions of section 3461 above referred to; and the limitation contained in that section partains to the mode of use of the streets for this purpose and that only. When, therefore, the mode of use has been agreed upon, as in this case it has been, by the ordinance referred to, accepted as we understand it has been by the telephone company, the entire jurisdiction of the city over the subject has been exercised and exhausted.

Municipalities in Ohio have no proprietary interest in the street within the city, and have no power in our opinion to impose any condition of payment for their use for telephone purposes, and any attempt in the ordinance in question to reserve to the city any benefit or advantage by reason of the use of the streets within the city for telephone purposes, would be beyond its power and void. We are therefore, of the opinion that section 9 of the ordinance above referred to, which provides for furnishing telephones to the city by The Home Telephone Company, without cost to the city, is not a binding obligation upon the Cuyahoga Telephone Company, as the assignee of the rights of The Home Telephone Company under said ordinance.

The provisions in section 10 of said ordinance, which undertakes to fix the rentals which The Home Telephone Company, or its assigns, might charge for the use or rental of telephones to its customers, is not within the power of the city to describe, and these provisions of the ordinance are, in our opinion, not binding upon your company. No express power has been delegated by the state to the city to regulate the prices of telephone service, and the city is therefore without power to prescribe the charges which the telephone company may make for the use of its instruments, and the incorporation of such a provision into the ordinance regulating the mode of use of the streets of the city for telephone purposes, is inoperative.

The acceptance of the provisions of this ordinance by your company, or its predecessor, the Home Telephone Company, would not, in our opinion, have the effect to render the provisions of these two sections above referred to binding upon your company. Such acceptance of the ordinance by The Home Telephone Company, or your company as its successor, would not be sufficient, in our opinion, to create any estoppel against your company to deny the validity of these provisions of the ordinance.

ILLINOIS MUTUAL ASSOCIATION.

REPRESENTATIVES of the various mutual telephone companies of Henry, Stark and Knox counties in Illinois met recently at Galva and formed a mutual company, or consolidation to form a basis of service. A roll call of telephone lines by counties showed that Knox county was represented in the meeting by twenty-six lines, including five trunk lines. Stark was represented by eleven lines, including three trunk lines and mutual switch boards. This made a total of 117 lines represented.

R. C. Hanlon, of Henry County; T. C. Church, of Stark, and Samuel Hanna, of Knox, were appointed a committee on organization. A committee on by-laws was also appointed. The organization is to be known as the Tri-County Mutual Telephone Association. It was voted that a strong effort be made to procure uniformity of Sunday service. Jacob Friend of Nekoma was elected president to serve for a year, S. V. Hannah vice-president, and Oscar Etter of Cambridge, secretary. A board of nine directors was chosen, three from each county. A motion prevailed by which any rule reported by the directors and ratified by two-thirds of the members of the association, shall be considered adopted.

TELEPHONE RURAL DELIVERY.

UNITED STATES SENATOR FAIRBANKS, of Indiana, has introduced a bill in the Senate calling for an appropriation of $25,000 for an experimental "rural telephone free delivery." His plan is to have letters opened by the receiving postmaster and telephoned to the parties to whom they are addressed.

A special stamp would be issued which will denote to the postmaster at the receiving office that the envelope is to be torn open and the contents telephoned. This would often save the greater part of the day in the rural delivery region, which will soon embrace all the settled parts of the country. Arrangements would be made with local telephone companies for this service.

OKLAHOMA INDEPENDENTS FORM ASSOCIATION.

INDEPENDENT telephone men of Oklahoma met recently at El Reno, O. T., and completed the organization of an Independent Association.

The meeting was called to order by C. E. Davis, of Weatherford. F. B. Patterson, of Elk City, was elected president *pro tempore*. The minutes of the last meeting were then read and the constitution and by-laws discussed. It was moved and seconded that the report of the committee on constitution and by-laws be accepted, and the articles be discussed and adopted by sections at the afternoon session. The meeting then adjourned until 2 p. m.

At the afternoon session, the constitution and by-laws were discussed and adopted. The following officers were then elected for the ensuing year: W. J. Steele, Kingfisher, president; F. B. Patterson, Elk City, vice-president; Charles E. Davis, secretary and treasurer. The executive committee is composed of the following: W. J. Steele, C. E. Davis, W. T. Talley, Granite; T. A. Dinkler, Hennessey, and R. C. Rhyne, Watonga.

The following Independent telephone men of Oklahoma and Texas were present: Dr. C. E. Davis, Oklahoma Southwestern Telephone Company, Weatherford; F. B. Patterson, Elk City Telephone Company, Elk City; J. W. Solomon, Francis Western Telephone Company, Reid; W. A. Ambler, Francis Western Telephone Company, Reid; W. J. Steele, Kingfisher Telephone Company, Kingfisher; D. G. Smith, Mangum & Quanna Telephone Company, Quanna, Tex.; D. H. Wright, Mangum Telephone Company, Mangum; W. T. Talley, Granite Telephone Company, Granite; H. Truman, Geary Telephone Company, Geary; T. A. Dinkler, Central Oklahoma Telephone Company, Hennessey; R. C. Rhyne, Watonga Telephone Company, Watonga; Mr. Dutton, Cordell Telephone Company, Cordell; Mr. Devarney, Superintendent Topeka & El Reno Telephone Company, El Reno.

The following manufacturers were represented: American Electric Telephone Company, by S. Bear; B. R. Electric Company, of Kansas City, by J. L. Sale; Stromberg-Carlson Telephone Manufacturing Company, by D. C. Lingo.

PENNSYLVANIA ENTHUSIASTIC FOR TELEPHONES.

NEW telephone lines and their construction in all parts of Bradford county indicate that within a short time the county will be completely girdled with wires and every important road will have its poles in evidence of a new factor in the business and social life of the people, says the Towanda, Pa., *Journal*. The eastern states have not advanced in the way of telephones as have those of the west but if the rest of Pennsylvania gets the same fever as has this county, the West will have to hustle to keep up with the procession.

The establishment of the Bradford County Telephone Company at Towanda has undoubtedly been the prime cause in the construction of lines in this section, many of which become feeders to the Towanda exchange and thus get an extended toll service while the ownership of the lines remains in the hands of the subscribers who in many instances put up their own poles pro rata and divide the cost of wire in the same way and purchase their own telephones.

In much the same way the Bradford county company becomes itself a feeder to the other big companies which have been established in the cities and itself becomes a part of a system of Independent companies which will eventually have a general service through the United States.

The interest in rural lines is very active. It is in contemplation that the Bradford county company will bring in the Rice lines from Myersburg to Towanda. The Rice lines go to LeRaysville. Another line that is under construction is that of the Camptown and Herrick Telephone association which Manager Thayer of the Towanda company has laid out and the poles of which the subscribers are putting up. H. B. Landen is manager of that company and it will meet the Bradford county company at Wyalusing. The exchange of the line will be at Camptown. The farmers near Covert are building a line to Troy to connect with the Independent lines and it is understood that farmers and business men near Mehoopany are to run a line to Dushore and Overton.

The Black Rural lines with some twenty subscribers meet the Bradford County Telephone Company's line, and it is then brought to Towanda, the subscribers paying a small toll to the Towanda exchange and owning their own line and telephones. Newell & Atwood are working on the establishment of lines in the western part of the county.

The latest place to get the epidemic is West Burlington, and an effort will be made there to form a local company and meet the lines of the Bradford county company.

ZIONSVILLE TELEPHONE COMPANY.

ZIONSVILLE, Indiana, has had an Independent company for several years. It has only been within the last year, however, that the people of Zionsville have taken to the telephone to a large extent. The Citizens' Telephone Company of Zionsville, was organized about a year ago, and took over the old plant.

There were there about fifty telephones in the town. There was not a single line to the country nor connection with any of the other local plants. Now there are about 250 telephones connected, with the assurance that the number will soon reach at least 300. These are all on the lines of the home company. To accommodate these people the company has already built twenty-one party lines extending into the country from two to seven or eight miles. Besides this the company has built about forty miles of trunk lines connecting with other local systems, so that it now has free service with all the subscribers on the following local plants: New Augusta, Carmel, Westfield, Baker Corner, Horton, Sheridan, Arcadia, Jolietville and Big Springs, including probably 1,000 telephones.

COMPETITION IN NEBRASKA.

THE war between the Independent and Bell telephone companies is now on in earnest in this county, says a special dispatch from Plattsmouth, Neb. A few days ago representatives of both companies swooped down upon the village Nehawka about the same time and an active canvass for business was begun. The merits of one and the demerits of the other were discussed at length, and the people of the village finally decided to hold a mass meeting and determine by vote which should have their patronage. The Plattsmouth Independent company received twice as many votes as its opponent, showing that the Independents have the inside track. The same kind of a fight is on at Murray and other points in the county, and reports from each of these places indicate that the Independent company is well in the lead. The fact that the Nebraska company has been doing business in Cass county for nearly twenty-five years and has never made an effort to accommodate the farmers is a strong point against it in the present fight. The Plattsmouth company has been in existence only four years.

OPINION AND COMMENT

TELEPHONE TARIFF IN JAPAN.

THE proper adjustment of telephone tariffs is the hardest problem that the general manager has to face. One always learns something from the experience of others, and a recent report upon the telephone service in Japan, containing statistics relating to tariffs, presents some food for reflection.

When a subscriber requests the installation of a telephone, he is placed upon a list and takes his turn in the order of priority, and, with customary Oriental complacence, orders are rarely filled with any degree of promptness. If the "would-be" subscriber owns the building in which the telephone is to be placed all goes well, but if he happens to be a tenant he must secure the written permission of the landlord to the installation of the instrument, and in case of removal, a similar formality must be complied with.

Subscriptions are under no circumstances transferable, but in case a subscriber dies he may demise his instrument (provided the subscription is paid) to any person he pleases. The Japanese have the same method of double naming as is current in this country, for two persons may be listed under the same number merely on request, no extra charge being made therefor.

Telephone tariffs, both in pay stations, public telephones and private instruments, are paid in stamps. The subscriber at the beginning of his term purchases a book containing the necessary coupons, which are similar to those used by the Western Union Telegraph Company and the American Telephone and Telegraph Company in this country. This method appears to have some merit, as it obviates any necessity of making change, and the subscriber can at once supply the required tariff. Annual charges are subdivided into three parts:

First—For every instrument a charge is made that is technically called the "Right of Participation." This entitles a "would-be" subscriber to enter his name upon the exchange list. When his turn arrives his instrument is installed and an annual charge is made for service. The charges for the "right of participation" and the annual subscription vary in different towns as follows:

Tokio and Osaka, right of participation, $7.50; annual subscription $35; Kyoto, Yokohama, Kobe and Nagoya, right of participation $5; annual subscription, $27; in all other cities, right of participation, $2.50; annual subscription, $24.

In addition to the specified tariffs each city is divided into zones about 350 feet in diameter. The charges given above are those for the central zone. In each case subscribers in other zones are required to pay an additional fee of $1 per year for each 350 feet that they are moved away from the office.

Additional instruments are listed at the following rates: A wall set, $6 per year; desk sets, $9 per year; with extension bells, $1; removal of instruments in the same building, $1; extension bells, 50 cents. The removal from one building to another, $7.50.

Where subscribers are located outside of the central zone they are required to pay for line construction at the rate of $5 for each 350 feet. Irrespective of any comparison between the amounts of American and Japanese charges, the plan shown possesses some merit, as it is an endeavor to proportion tariffs somewhat in accordance with the quantity of plant or the investment that the telephone company must provide to reach various substations, and in this respect a divided tariff is certainly more just than the current flat rates of this country.

MUNICIPAL TELEPHONY.

AMONG other unfailing signs of the awakening life that heralds the vernal equinox is the reappearance of the *municipal ownership crank.* He knows but one story and sings but one song. Sometimes it is electric light, sometimes street railways; just now it happens to be telephones, but the object matters little. Anyone or anything that has a grievance can obtain immediate relief, for a single dose of his universal patent medicine, *"The Great Municipal Control Remedy"* is warranted to cure (or kill) every community now writhing in the grasp of soulless corporations. So far the electric railway has evaded his speciousness; gas and electric light have, after a fearful struggle, largely escaped from his clutches, and, seeking new worlds to conquer, he turns his attention to the telephone. Of course there should be a telephone in every house; we all know that; and some of us are spending all our time and most of our money to bring about this Utopian condition. If munnicipal ownership would really accomplish this we would lend a hearty co-operation. But there appear to be many difficulties that as yet the glittering generalities of the socialist fail to solve.

Our friend compares a telephone plant to a water works, and argues that if municipal management of water is desirable, as in many cases it certainly is, a similar control of the telephone should be so also. But here a little knowledge is a dangerous thing. Telephony and water are utterly incommensurable. A water works is crystallized with the experience of centuries, while the telephone is the youngest of the arts, and the whole design and operation of municipal affairs is opposed to the development of that alert mind necessary to keep pace with a business that is revolutionized every five years. The duty of the superintendent of water works ceases when the steel pipes are kept full, and if the water won't run from your faucet send for a plumber! Suppose central didn't answer, what kind of a telephonic plumber would we get under municipal control. If he should resemble the water works species the frying-pan and the fire would fail as a comparison. And what satisfaction should we get from complaints addressed to a political boss? Unless the superintendent of the municipal telephone plant were appointed for life he *could* not have time to learn the business and form that acquaintance with subscribers necessary to the successful manager, and if he were playing politics he *would* not. After all is said and done, the actual working of the two plans is the best answer. Compare the corporate system of the United States with the municipal systems of Europe—for instance, the Berlin exchange is still a grounded system.

NIGHT RATE AND THREE MINUTE SERVICE*

By C. E. Tarte.

THERE is no branch of telephone work that requires so much study, so much thought, and so much looking after details as toll business. Interchange of business, routing of messages, division of tolls, standardizing of rates, standardizing of apparatus, codes for facilitating the handling of messages, limit of time, night rates, and numerous other problems confront us and have confronted us since the birth of the Independent movement. Some of the problems have been worked out, and others must be worked out in the very near future.

The practice among Bell companies for a good many years was to make a five-minute rate, but until within a comparatively short time the schedule was not insisted on except by the Long Distance Company. With heavily loaded, grounded, iron circuits a subscriber was considered lucky to get his message through in 10 or 15 minutes and "overtime" was rarely charged.

With the advent of copper lines and metallic circuits a closer observance was made of this schedule and the public soon learned that if they talked "overtime" they had to pay for it.

The Independent Companies also started with a five minute rate and in some cases they were in about the same condition that the Bell had been in. Subscribers were lucky to get their messages through in any time whatever and no attempt was made to charge for "overtime."

When better lines were built and better service given a closer observance should have been paid to "overtime" charges, but with a few rare exceptions it is not being done.

Now it is proposed to establish a three-minute rate.

What will be the result?

A careful study of the average time consumed with ten, fifteen and twenty-cent messages ("short-distance" messages, they might be called) leads me to believe that it would not be wise to change to a three-minute rate at the present time on messages of this kind.

The average time on "short-distance" messages is about three minutes and ten seconds.

As service is improved and toll lines are used more, the average length of these messages will be shorter and the time limit will take care of itself without any help from telephone companies.

A subscriber using a toll line for ten, fifteen or twenty cents does not feel that he is paying an exorbitant price for service rendered and makes no effort to prolong his message for the sake of getting his money's worth.

He says what is necessary and quits. It may take a minute or three minutes, and occasionally five, but as the habit grows he treats these calls about the same as he does local calls, and in a short time it will be found that the average "short-distance" call will be nearer two minutes than three.

Then why not make the three-minute rate instead of five?

There are several reasons why no change should be made.

As stated before, the average length of these messages is about three minutes now, and will be less, whether the three-minute schedule is established or not.

Our subscribers have been in the habit of talking five minutes at established rates if they wish to. They very seldom talk the full five minutes, but know that they can if they want to.

Now, if we establish a three-minute rate, what happens? Nine times out of ten the subscriber talks less than three minutes, but on the tenth call he talks four or possibly five, and we check him "overtime." He is indignant, and if the "overtime" charge is insisted on he is apt to change from a warm, outspoken and energetic friend to at least a passive and possibly to an active enemy.

There is little to gain and a great deal to lose in a change of this kind, and I would suggest going slow before doing it.

Another thing to be taken into consideration is the effect that this change would have on your country exchange and toll station. The merchant at the village cross roads is anxious to have toll line connections in his store, and, once having it, would hesitate a long while before letting it go, but sometimes he chafes considerably under the collar when he thinks of the trouble and worry that the line causes and the slight financial remuneration he gets for his work.

As a general proposition, the commission allowed is as much as the telephone company can give and make a fair return on the investment, but this does not help your country manager out. He runs a general store, we will say, and sells everything from shoestrings to stoves. While he is taking care of several customers someone comes in to use the telephone. He leaves his customer, gets the connection through and goes back to work. This is bad enough, but if in addition to getting the connection through he is compelled to watch the clock and see whether "overtime" is to be charged he will soon kick over the traces and will either have to be paid a larger commission or he will give up the station.

On messages where the rates are twenty-five cents or over—messages that might be called "long-distance"—a three-minute schedule should be established. It is a question of grave doubt whether long circuits can earn a fair return on the investment at the present rate of one-half cent a mile for a five-minute conversation.

I do not believe it will increase revenues to raise rates. It is more likely to decrease revenues by driving away business, and, such being the case, some other plan must be tried.

The other remedy seems to be a three-minute schedule instead of five. This schedule, once established, will enable us to handle more messages on each line than we are now handling, and the result will be an increase in the revenues of each line. It might be said that the argument does not hold good. That the average length of all messages, like the average length of the "short-distance" message, is only about three minutes, and that making a three-minute schedule would not improve conditions whatever.

If the above was correct I would not recommend that a three-minute rate for any kind of a message be established, but it is not. But a very small per cent of the calls from any toll station or exchange are for points where the rates are over twenty cents. The records of the Citizens' Telephone Company show that out of 25,000 toll connections handled during a certain period, 82 per cent were ten, fifteen and twenty-cent messages, 9 per cent twenty-five cent messages, and the remaining 9 per cent thirty-cent and over.

This shows either that the ordinary telephone user does not have much occasion to call points more than thirty-five or forty miles away or that he hesitates about calling them because the rate is too high, and only does so on matters of importance.

The result is that when he does call he finds out how long he can use the line, and, even though he might be able to transact all of his business in two or three minutes, he will string it out to the limit and get his money's worth. Records will show that where five minutes are allowed for "long-distance" messages that the average is nearer to four or four and one-half minutes than it is to three, as on "short-distance" messages.

I don't believe that a single customer will be driven away or a message lost by charging to a three-minute rate on "long-distance" messages. The majority of these calls are matters of importance, and the call will be made whether three minutes or five minutes are allowed.

The customer having found that he only has three minutes to talk, will regulate his conversation so that he can get through in proper time, and these calls are such a small percentage of the total business that the few complaints and objections that may arise can be smoothed over and taken care of.

It may be possible to re-arrange the present schedule and make a slight reduction to points affected by the change. If this can be done it will more than offset the objections raised to reducing the time limit.

Cheap rates encourage the use of telephones either for local or toll purposes—a subscriber may hesitate to talk once for thirty-five or forty cents and talk three or four times for twenty-five cents—and on that account it would be well to give serious thought toward making a slight reduction in existing rates.

Seventy-two per cent of toll line business is done during the eight hours of each day from 8 to 12 A. M. and from 1 to 5 P. M., and 80 per cent is done between 8 A. M. and 6 P. M.

This means that during fourteen hours out of every twenty-four, toll lines are practically idle, and if anything can be done to increase business during these idle hours it should be done at once.

Some telephone companies have established what they call a

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*Paper read at the Michigan Association Convention.

"night rate" for the purpose of making this increase, and it seems wise at this juncture for us to decide whether or not we will do the same thing and what kind of messages we shall apply it to.

If by establishing a "night rate" we can increase our revenues and can give to our subscribers a cheaper rate at certain hours than we are now giving, it should be done.

It is doubtful whether it would be good business policy to make a "night rate" on "short-distance" messages. These rates are so low that a subscriber will not be apt to wait until after 6 P. M. because he saves a few cents by so doing, and a cheaper rate on business that will come anyhow at the regular rate would not show good judgment and would simply be throwing money away.

On "long-distance" messages different conditions are found. Subscribers hesitate about using toll lines to points where the rate is 35 and 40 cents or over, and only do so on matters of importance. Now if we can offer sume inducements in the way of lower rates to these points our subscribers will use the lines for all kinds of business, important and unimportant, and, having gotten into the telephone habit, will soon use them for social purposes as well.

This low rate can be made operative during those hours of the day that our lines are now idle—from 6 to 8 A. M.

There should be more definite and uniform rules for the handling of toll business. Operators and agents should be told the difference between the right way and the wrong way of putting messages through. They should understand that lines are built for business purposes and not for the convenience of employes; that brevity is a cardinal virtue if not carried too far; that the repeating of what is heard on lines, even to other employes, is not only sufficient cause for dismissal, but an infringement of the law; that courtesy pays in the telephone business as in all other kinds of business. They should be posted on the proper routing of messages. They should know enough to listen in on lines, and not attempt to use them when they are already in use. In fact there are so many things that should be done that are not being done or are being done improperly that a code of rules should be drawn up and sent to every manager and agent in the State.

ELECTRICAL MEASUREMENTS—ARTICLE VII—VOLTMETER TESTS

By Arthur Vaughan Abbott

OF all electrical measuring instruments, none, save the Wheatstone bridge, has so wide a range of usefulness as the voltmeter, but prior to considering the various tests that may be performed with it, a little electrical theory is necessary. Electricity has been compared to a stream of water traversing a pipe, and we know by experience that there is a very definite and exact relationship between the quantity of water delivered, the pressure in the tank and the friction of the pipe. There is a similar connection between the quantity of electricity passing in any circuit, the electromotive force of the battery or generator, and the resistance of the wire, or other conductor. If we denote by E the electromotive force or pressure of the source of electricity in volts, by the symbol R the total resistance of the entire circuit in ohms, the quantity of current is at once given by the very simple and familiar expression:

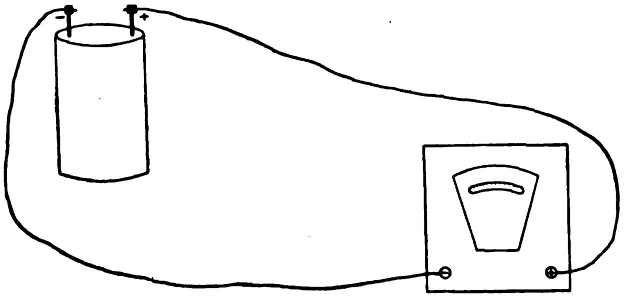


FIG. 1.

$$C = \frac{E}{R}$$

In this case the current C is estimated in *amperes,* for the *ampere* is the *name* of the unit of current (in memory of the famous French electrician Amperè) just as the volt (after Volta) is the name of the unit of electromotive force. Like all other units of measure the ampere is an arbitrary quantity. If there is an electromotive force of one volt, acting on a circuit having a resistance of one ohm, we say that one *ampere* of current will flow, and that is about all we know. Practically an ordinary 16 candle-power lamp takes very nearly half an ampere. The common lamps used on a switchboard for signals take one tenth of an ampere. A ringing generator gives about a quarter of an ampere. Subscribers to a common battery switchboard when they talk take from .05 to .15 amperes from the storage battery depending on the length of their lines. A 1,200 candle-power arc lamp uses about 4.5 amperes and a 2,000 c. p. lamp about 7 amperes. The formula given above is called *"Ohm's Law,"* from the name of its discoverer, Dr. Ohm. It is the most famous and widely known of all electrical laws, and forms the basis of nearly every electrical test that is made. Ohm's law may be written in the following three forms:

$$C = \frac{E}{R};\ E = C\ R;\ and\ R = \frac{C}{E}$$

Owing to the importance of this principle we advise our readers to memorize all these forms so they shall be as familiar as the letters of the alphabet. From a consideration of this formula it is very plain that if any two of the quantities are known or can be measured the third one may be calculated. Electrical testing largely consists in measuring any two of these quantities for the particular case in question, and calculating the third.

The simplest test to be made with a voltmeter is that of measuring the electromotive force of any source of electricity. All that is needed is to connect one pole of the voltmeter with one pole of the source, and the other pole of the voltmeter with the other pole of the source, as in Fig. 1, and read the needle; the number of divisions of the scale at which the needle rests is the voltage. But the voltmeter can give still more information. One of its poles is marked + and the other one —; this means that

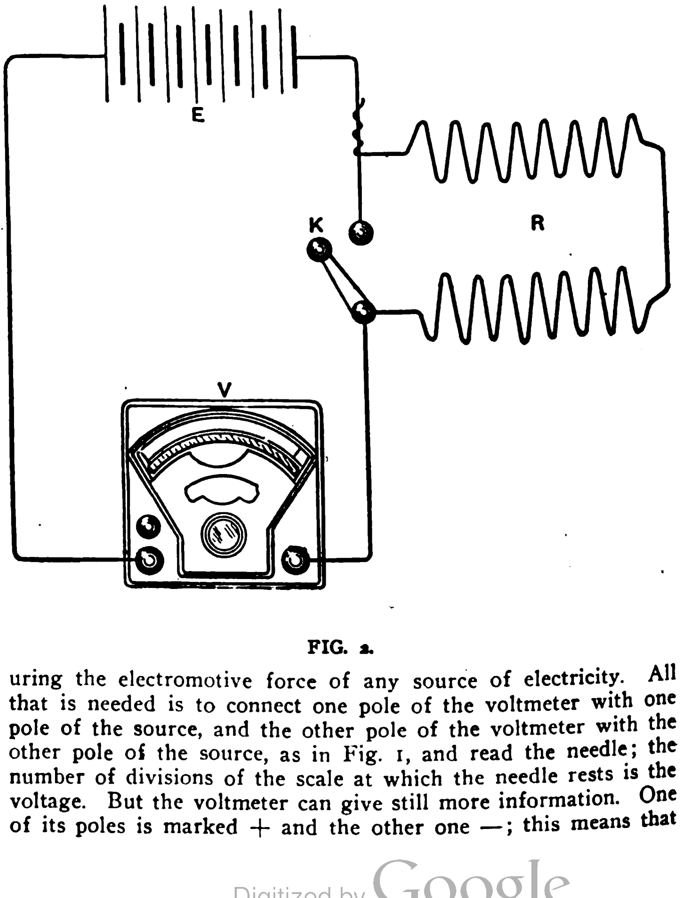


FIG. 2.

Editor's Note.—The first article of this series appeared in the issue of January 17. They will continue for many months.

when the pole marked + is connected to the positive pole of the source the needle will move to the *right hand.* Should the instrument be joined to any unknown source and the needle move toward the *left hand* running off the scale and under the brass case it would mean that the positive pole of the source had been connected to the minus pole of the voltmeter, and that the wires must be reversed. So the voltmeter tells us not only how many volts of electromotive force any generator gives, but which is its positive and negative pole. It is rare in telephone work to deal with high voltage, and a voltmeter reading to 150 volts will solve most telephonic problems. Still sometimes a line is crossed with an electric light wire, of which it is desirable to measure the pressure, and there is no available instrument except the 150 voltmeter. If we know the resistance of the voltmeter, which is always marked on the cover of the box in which it is placed, and if we have another known resistance, say half a dozen 1,000 ohm drops or 1,600 ohm ringers we can determine the voltage of the foreign wire quite accurately as follows: Connect the voltmeter and the drops in series across the source of electricity the pressure of which is to be measured, and read the needle. Suppose the resistance of the voltmeter to be r ohms, and the added resistance in the drops to be R ohms, then the needle reading must be multiplied by $\frac{R + r}{r}$, that is add the resistance of the voltmeter and the drops, divide the sum by the resistance of the voltmeter and multiply by the needle reading; the result will be the voltage desired. Example: Suppose we wish to measure a circuit carrying about a thousand volts with a voltmeter reading to 150 volts, and having a resistance of 1,000 ohms. Add eight 1,000 drops in series, and suppose the needle to read 114 volts, then $\frac{1{,}000 + 8{,}000}{1{,}000} \times 114 = 1{,}026$ volts. Usually voltmeters have much more than 1,000 ohms resistance, and a lot of drops or ringers would be needed, still this method is very handy on a pinch.

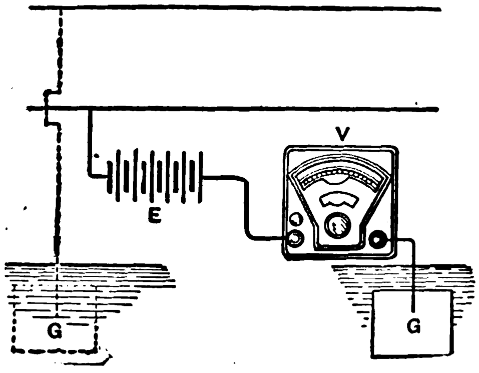


FIG. 3.

A voltmeter makes a very convenient instrument with which to determine high resistance, such as those of drops, bells, relays, etc. Set the apparatus up as in Fig. 2 in which V is the voltmeter, R the resistance to be measured, E any battery, a dozen or twenty dry cups will do, and K a switch, so arranged that the resistance to be measured can be short circuited. Let r be the resistance of the voltmeter in ohms. Close the switch K and read the needle and call the deflection D; then open the switch and read the needle again, let this reading be d, then the resistance to be measured R is found by the formula

$$R = r\left(\frac{D-d}{d}\right)$$

Example: Measure a 1,000 drop with five cells of dry battery and a double scale voltmeter 0 to 15 and 0 to 150. Resistance of lower scale 510 ohms; upper scale 5,495 ohms. Connect the apparatus as shown in Fig. 2, using the lower scale. Suppose the reading with K closed to be 10 and with K open to be 3 then

$$R = 510 \times \frac{10 - 3}{3} = 510 \times 2\ 1\text{-}3 = 1{,}188 \text{ ohms.}$$

This plan may be used with great ease and rapidity to test the insulation of open wire or cable lines. For this purpose a high resistance voltmeter 10,000 to 25,000 ohms and a powerful battery is advisable. If an Edison lighting circuit is handy it is a splendid source of test current. Open the line at the cable head, put one side to battery voltmeter and ground as shown in Fig. 3; read the voltmeter and calculate insulation as above. Example: Suppose a cable wire 1¾ miles long to be measured for insulation with an Edison circuit giving 112 volts, and the upper scale of the voltmeter described above. In this case D is 112, r is 5,495 ohms; suppose d to be 5 then $R = 5{,}495 \times \frac{112 - 5}{5} = 117{,}593$ ohms for the entire wire or 206,000 ohms per mile. If both sides of the line are well insulated, the insulation between the conductors may be tested by grounding the other side of the line as shown in Fig. 3. A still better method is to put voltmeter battery and lines in series as in Fig. 2, but in this case the Edison cannot be used, as the source of test current must not be grounded.

CANADIAN BELL METHODS

An heroic effort is being made by the Bell Telephone Company to squelch the Markham and Pickering Co-operative Telephone Company, says the Toronto, Canada, *World.* According to reliable authority, agents of the Bell have visited the various farmers and village subscribers with a view to having them abandon their private line entirely or turn the enterprise over to the Bell at cost with a guarantee of free service for five years. A concerted effort in this direction was made some weeks ago, and it is exactly in line with the policy of the Bell Company in the past.

The *World* then explains how the Bell operated to suppress a similar co-operative line composed of farmers and business men. This company was organized near Toronto, and the circumstances were quite similar to the case of the Markham and Pickering Company.

The people attempted for a long time to interest the Bell in the erection of a line. In each instance the Bell agent declared that there was not enough business to warrant the investment. As the business of the section increased, another effort was made to have the line constructed. The Bell manager wrote that it was impossible, refused to consider the proposition in any form and requested that the subject be dropped, as he did not desire to be bothered by further correspondence.

This aroused the people, and a line five miles in length was constructed and was soon doing business in a most satisfactory manner. The cost was something less than $50 a subscriber, and this paid for the service outright, barring tne annual cost, which was estimated to be some $5 each. Then the Bell Company rushed its agents in and began to make bids to secure the Independent line. They did everything they could in this direction without success. Finally they offered to each subscriber, provided they would abandon their line or turn it over to them, service for five years at the nominal expense of $5 each, with complete connection with all parts of the entire Bell service. This proved too much for the Independent company, and they were absorbed by the strong company. This seems to be the game of the Bell wherever an Independent company is started, even though they have had the chance to do the work at first and refused.

The effort to block the co-operative company around Locust Hill continues *The World,* is very similar to this case. Manager Dunstan of the Bell Company in Toronto explains that this is not under his direction, and that his jurisdiction is confined to the city. He said this outside work was handled from the headquarters of the company at Montreal, and he knew nothing of it.

It is inevitable that the big monopoly give its consent to the entrance of Locust Hill people into the C. P. R. station, or it will succeed in buying out the company, since it recognizes the frail support it stands on when the case reaches parliament. The officers would rather give their consent in isolated instances of this kind than let the matter go to an issue before parliament and take a chance on the adoption of a general law enforcing these terms for all Independent lines. This is the danger the Bell people are trying desperately to avoid right now. The interest stirred up over this case has been so general, however, that a parliamentary investigation of the exclusive contract between the C. P. R. and the Bell is the least the monoply can expect.

Patents

IMPROVED MAGNETO BELL.

C. H. Thordarson, of Chicago, patents (No. 720,082) a magneto bell. In this device both the permanent magnet and the armature are so arranged that they are adjustable, and thus a bell of greater sensitiveness is secured. It is illustrated in Figs. 1 and 2, from which it will be seen that the permanent magnet *C* has a slotted hole *D*, through which a screw *E* passes, whereby it is secured to frame *R*. By loosening the screw the magnet may be adjusted. The vibrating armature is supported upon a central post *P*, which is hollow and secured to the base *R* by means of a screw *Q*, thus providing adjustment in this direction.

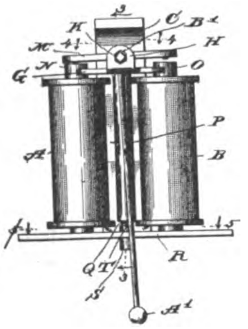


FIG. 1.

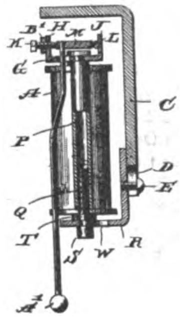
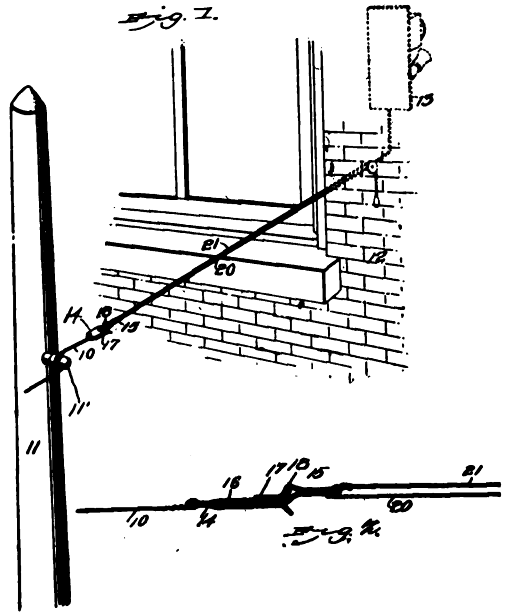


FIG. 2.

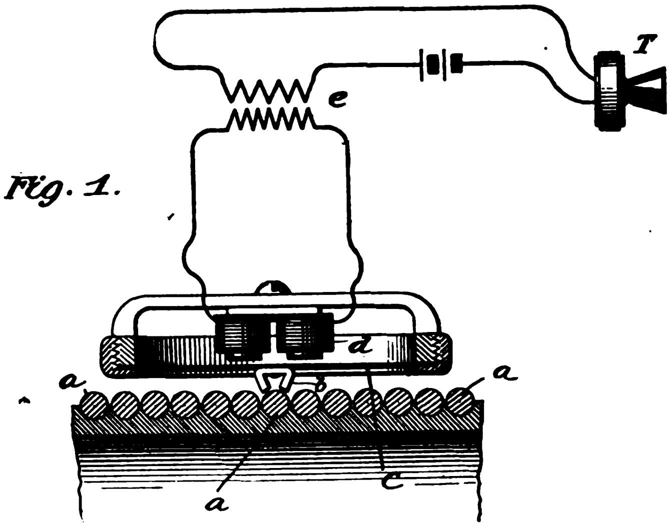
SUB-STATION PROTECTION.

G. R. Bonham, of Empire Prairie, Mo., patents (No. 720,103) a telephone protecting device. The object of this patent is to provide an improved protecting device for telephone sub-stations. The patent is illustrated in Figs. 1 and 2. Upon the line circuit, outside the house wall, the inventor provides a kind of spring jack, shown in Fig. 2. This jack forms the connection between the sub-station line and the open wire plant. To the end of the jack a cord is attached which passes to the inside of the house wall. In case of an electric storm, the subscriber may open the line by pulling the cord and thus separating the contacts of the jack. When the storm has departed, connection is easily re-established.



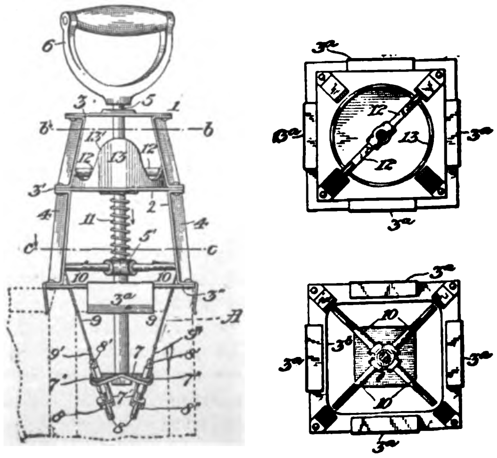
NEW FORM OF TELEGRAPHONE.

William A. Rosenbaum, of New Rochelle, N. Y., patents (No. 720,621) apparatus for electro-magnetically recording speech. This patent relates to an improvement for recording speech after the manner of the Poulson telegraphone. In the Poulson instrument an electro-magnet is placed over the wire which receives the magnetic impressions from the speech waves. In the present patent, which is illustrated in Fig. 1, an instrument which closely resembles a telephone receiver to the center of the diaphragm of which a permanent steel magnet is attached is substituted for the electro-magnet of the Poulson instrument. The inventor claims that the permanent magnet *B* may be made very powerful and adjusted in the closest proximity to the piano wire, and thus the record may be made much louder than in the Poulson instrument.



NEW CONDUIT MANDREL.

Robert W. Lyle, New York, N. Y., patents (No. 720,369) a mandrel for conduit sections. The object of this patent is to produce an improved device for cleaning out the ducts of underground conduit. It is illustrated in Fig. 1. There is a core 1, around which the inventor cuts a helical grove in which the swab or brush is placed. A disc at each end of the core acts as a scraper, and centers the mandrel in the duct.



The Week's Messages.

NEW COMPANIES

LAURA, ILL.—Northern Millbrook Telephone Company, of Laura, has been organized with a capital stock of $600; incorporators, I. M. Stowell, J. A. Shafer, E. L. Barrett.

LAWRENCEVILLE, ILL.—Some of the citizens of Bond recently organized the Lawrence County Home Mutual Telephone Company. Officers: D. F. Johnson, president; R. F. Jones, vice-president; C. W. Dollanan, secretary and treasurer.

MT. CARMEL, ILL.—The Mt. Carmel Telephone Company has been incorporated with a capital stock of $7,000. The incorporators are: H. J. Leach, C. W. Leach and John Coleman.

PROPHETSTOWN, ILL.—The Whiteside Farmers' Mutual Telephone Company, of Prophetstown, has been incorporated, capital $10,000. Incorporators: W. E. Reynolds, J. H. Mosher, and Millard F. Hill.

BAINBRIDGE, IND.—Bainbridge Telephone Company has been incorporated, capital $800. Directors: H. O. Batman, N. W. Ader, A. L. Priest, John Jacobs, Charles Carver, Milton Darnall, Cass Powers, Jacob McVey, Charles Hughes, R. P. Hilands, Eugene S. Priest and L. Collins.

OWENSVILLE, IND.—At a mass meeting held here the citizens decided to organize an Independent telephone company, which will connect with all country and long distance lines. The company will erect an exchange building and construct its own system.

ROCKFIELD, IND.—About seventy-five of the best citizens of Rock Creek and Jackson townships met here and organized the Rockfield Co-Operative Telephone Company. The company will put up twenty-five miles of wires, of which a branch will include the town of Camden. This line will be connected with the local line that is being built at Burrows, and also with the Idaville and Monticello lines. The company contemplates building in the near future a line to Flora, where it will be connected with the Frankfort line, and a line will probably be built to connect with Burlington. The officers elected are: President, John W. Kerlin; vice-president, A. L. Surface; secretary, P. M. Byrum; treasurer, W. H. Galgreth; general manager, A. B. Snoeberger; division superintendents, Charles Montgomery, Walter Coble, Charles Raber and W. N. May; trustees, F. M. Tyrrell, C. L. Million and Samuel Clowser. Work will commence on the new line as soon as the weather will permit.

STONY POINT, IND.—The Home Mutual Telephone Company, of Stony Point, has been organized with the following officers: Joel Hall, president; John C. Wolf, secretary; Z. F. Byrer, treasurer.

CEDAR FALLS, IA.—The Farmers' Telephone Company has been organized. A committee, consisting of H. N. Butterfield, D. K. Smalling, C. J. Virden, C. A. Rownd and C. B. Santee has been appointed to prepare articles of incorporation. Subscribers will be solicited and the work pushed in a manner that will insure success for the enterprise.

CLAY CENTER, KAN.—A new telephone company, known as the Home Telephone Company of Clay Center, has filed its charter. The capital stock is placed at $20,000, and the incorporators are G. M. Stratton, E. H. Swenson, W. Vincent, W. G. Meals and G. W. Hanna, all business men of that city. The new company claims that in the spring it will put in a new telephone system covering Clay County and the surrounding country.

AUGUSTA, ME.—In the House an act was presented incorporating the Maine rural telephone system and providing that Frank W. Winter, his associates and successors, are made a body corporate and authorized to construct and operate lines of telegraph and telephone throughout the State of Maine.

HALLDALE, ME.—The Knox & Montville Telephone Company, of Halldale, has been incorporated with a capital stock of $10,000. J. H. Vose, president; C. A. Hall, treasurer.

GRANBY, MASS.—The Granby Telephone and Telegraph Company has been organized with a capital stock of $1,200. The following officers have been elected: President, W. H. Taylor; clerk and treasurer, Dr. R. A. Dickson; board of directors, W. A. Taylor, C. W. Ferry, Daniel C. Nutting, G. F. Eastman, G. L. Witt and R. A. Dickson.

SYKESVILLE, MD.—A movement has been started to build a telephone line from Winfield to Sykesville. Roby Hering, Harry L. Bushey, Harry R. Devries, John Bushey and Aubrey J. Stem are some of the leaders of the project.

CAMDEN, MICH.—At a recent meeting of the Camden Farmers' Club, at the home of Charles Alvord, a committee was appointed to solicit subscribers to a Mutual Telephone Company, to be organized in the same general plan as the Jefferson Township Company. This company will probably connect with the Jefferson Township Company at Frontier and also the rural lines of Williams County, Ohio, and Steuben County, Ind.

CAMERON, MO.—The Big Four Mutual Telephone Company has been organized, and the following have been elected officers: Huron Buck, president; J. P. Benjamin, secretary, and J. T. Wyckoff, treasurer.

DURHAM, MO.—A new telephone company has been organized to run a line from here to Gilead. John Pulliam, of this place, is president.

LA GRANGE, MO.—A new telephone company will soon be organized here. It will be known as the Bozarth Telephone Company and will run a line to Taylor, a distance of about eight miles. Headquarters will be in this town.

LA GRANGE, MO.—A new telephone company has been organized here by the citizens and farmers of La Grange and vicinity, with the following officers: Joseph Lindley, secretary and treasurer; G. A. Armstrong, president; H. H. Wolfmeyer, and his five sons, Edward Tieman, Patrick Ryan, William Shafer and O. S. Barker, directors. It will be known as the Wyaconda Telephone Company and will build a line for the benefit of these gentlemen and citizens of the section through which the line will run. Work will begin as soon as the weather permits.

PALMYRA, MO.—The Eureka Telephone Company has organized at Pafford's Store. Dan Phillips was elected president, L. Preston treasurer, H. Pafford secretary, and P. Powel business manager.

MISSOULA, MONT.—The farmers of the Bitter Root Valley are making arrangements to organize an Independent telephone company. It is their intention to have the stock subscribed for at the rate of $100 per farmer. The stock will be sold for notes, which will be discounted by the local bank, and the notes will be payable in one year. The matter is being promoted by B. A. MacLane. Headquarters will be in Stevensville.

GENEVA, NEB.—Articles of incorporation of the Fillmore County Telephone Company have been filed in the County Clerk's office. Officers: President, C. H. Brown; secretary, John Barsby; E. K. Cobb, treasurer.

BERGEN, N. Y.—The Bergen Telephone Company has been incorporated. The company has a capital of $1,200. In addition to conducting a local exchange in Bergen, it is authorized to do business in Genesee and Monroe counties. Its life is for twenty-five years.

BOVINA, N. Y.—The Bovina and Middletown Telephone Company, of Bovina, has been incorporated, capital $220. Incorporators: Charles D. Sanford, Wm. D. Winters and John W. Elliott.

CATSKILL, N. Y.—The West Shore Home Telephone Company, Catskill, has been incorporated to operate in Ulster, Greene, and Albany counties; capital, $100,000. Directors: S. B. Rawson and T. M. Brush, Elyria, Ohio, and Howard Hendrickson, Albany.

PERU, N. Y.—Citizens of Peru have organized the Citizens' Telephone Association for the purpose of furnishing local service. N. R. Weaver was chosen chairman and H. E. Baker secretary.

ARCADIA, OHIO.—The Arcadia Mutual Telephone Company has been organized, and the following officers chosen: President, F. L. Smart; vice-president, A. L. Anderson; secretary, J. W. Putnam; treasurer, G. W. Dick.

CELINA, OHIO.—The Celina & Mercer County Telephone Company, has been incorporated with a capital stock of $80,000 by G. E. Nungester, G. P. O. Miller, Levi Young, John A. Hoagland, E. G. Pengerer and F. Beiersdorfer.

DEFIANCE, OHIO.—C. R. Shuter, of Evansport, has obtained a five-year lease on all of the county lines belonging to the Northwest Telephone Company. He will organize the Home Telephone Company, which will extend its service to all the adjoining counties. Mr. Shuter will become the manager for the new company.

TUPPERS PLAINS, OHIO.—The Citizens' Telephone Company, of Tup-

THE WEEK'S MESSAGES—Continued.

pers Plains, Meigs County, has incorporated with $10,000 capital stock to transact a general telephone business.

ROCHESTER, WIS.—The Burlington, Rochester & Kansasville Telephone Company has been incorporated for the purpose of the construction of telephone lines and dealing in telephone apparatus and supplies and transaction of general telephone business within the State. Capital stock, $2,500. Incorporators: George W. Rowntree, Brook Sheard and George W. Waller.

FINANCIAL.

LOS ANGELES, CAL.—A statement filed by the Home Telephone Company shows a total expenditure to date by the eompany of $265,153, divided as follows: Labor, $59,686; aerial material, $11,571; underground, $36,775; cable, $57,121.

AVOCA, IOWA.—The Harlan & Avoca Telephone Company is placing numerous shares of stock with Avoca investors. The extensions and improvements to be made to the company's lines this spring will call for the use of a much larger capital.

BOSTON MASS.—The Pittsburg Telephone Company has increased its capital from $1,250,000 to $10,000,000. It reports gross earnings for the year ended December 31 $2,165,981, an increase of $228,249; net $578,080, increase $153,328.

HEATH, MASS.—The Heath Telephone Company will increase its capital stock from $12,000 to $18,000.

POCOMOKE, MD.—The Pocomoke Telephone Company has declared a semi-annual dividend of 6 per cent. and increased its capital stock from $15,000 to $25,000. The increase is to promote extensions.

CLEVELAND, OHIO.—The earnings of the Cuyahoga Telephone Company for January, 1903, are as follows:

Gross Earnings	$32,645.73
Expenses	17,619.38
Net earnings	$15,026.35
Deductions—	
Interest on bonds	$ 9,304.17
Interest on deferred coupons	232.61
Interest on bills payable	240.00
General interest	208.83
Total	$ 9,985.11
Surplus	5,041.24
Deductions from surplus items of 1902	344.33
Balance	$ 4,696.91

GREENVILLE, PA.—The Union or Citizens' Telephone Company, which has extensive lines all over Sharon and Mercer County, has just placed on record a mortgage for $200,000. It is to secure a loan received from the Erie Dime Savings and Trust Company.

SUSQUEHANNA, PA.—At the January meeting of the board of directors of the Susquehanna Telephone and Telegraph Company, a semi-annual assessment of $2.50 per share was levied.

MEQUON, WIS.—The Mequon Telephone Company has increased its capital stock from $25,000 to $50,000.

FRANCHISES.

PAONIA, COLO.—Frank Lambertson and L. P. Bell have been granted a franchise. Their company will be known as the Delta County Co-Operation Telephone Company. It is their purpose to build a system co-extensive with this county, built by the telephone users being run on the co-operative plan.

CHAMPAIGN, ILL.—The Home Telephone Company has been granted a franchise by the City Council.

EASTHAMPTON, MASS.—The Home Telephone Company, of Elyria, Ohio, will ask for a franchise here. Its representative is Henry J. Griswold, of New Haven, Conn.

PITTSFIELD, MASS.—The Selectmen have granted a franchise to the Rural Telephone Company, which is composed of some of the business men of the village, to build a telephone line to State line, where it will be connected by switch with the West Center, Austerlitz and Canaan lines, giving communication with about 225 subscribers.

HANNIBAL, MO.—The County Court has granted a company, headed by R. W. Stevenson, the privilege to construct telephone lines in Warren Township. The new system will connect Monroe City, Andrew Chapel and Heather.

LA GRANGE, MO.—The Lindale Telephone Company has been granted a ten-year franchise by the City Council.

NEW HARTFORD, MO.—Permission has been granted to Dr. J. C. Shelton and D. Kerr to erect a telephone line from New Hartford to Middletown, to be known as the New Hartford and Middletown Telephone Company.

STOCKTON, MO.—V. G. Hobbs has been granted the right to erect telephone lines on public highways from Cane Hill to Fair Play.

GRAND ISLAND, NEB.—Charles G. Ryan, H. J. Palmer, G. B. Bell, F. W. Ashton, the incorporators of the Home Telephone Company, have asked the City Council for a franchise for a telephone system.

RAHWAY, N. J.—There are rumors that the recently incorporated Central New Jersey Telephone Company, which is a branch of the Inter-State Telephone Company of Trenton, will shortly apply for a franchise here and in other portions of the State. Four trunk lines are proposed, the first, it is said, will begin at Elizabeth and connect Rahway, Woodbridge, Perth Amboy, South Amboy, Cliffwood, Keyport, Matawan, Middletown, Red Bank, Oceanport, Long Branch, West End, Elberon, Deal Beach, Allenhurst, Ocean Grove, Asbury Park, Belmar, Como, Spring Lake, Lake Beach and Sea Girt. The second will tap the first at Rahway and connect Iselin, Menlo Park, Metuchen, New Brunswick, Milltown, Helmetta, Jamesburg, Englishtown, Freehold, Farmingdale, Manesquan, and Sea Girt. The third will start from the first at Elizabeth and connect with Roselle, Cranford, Westfield, Plainfield, Dunellen and Metuchen. The fourth will tap the last at Dunellen and connect with Bound Brook at Somerville.

CHURCHVILLE, N. Y.—The Inter-Ocean Telephone and Telegraph Company, of Buffalo, has asked for a franchise to erect a local exchange. It is believed that the board will grant the new company a franchise and that the wires instead of being strung on poles will be placed underground.

GROVELAND, N. Y.—C. H. Thompson, who represents the Inter-Ocean Telephone Company of Buffalo, is here securing the right for a telephone system.

LYNDONVILLE, N. Y.—Representatives of the Orleans County Rural Telephone Company have secured the right of way and permits to set poles and string wires from Lyndonville to Ridgeway.

GEORGETOWN, OHIO.—The Fledder Johann Company will apply to the City Council for a franchise to construct and operate a local telephone system.

PITTSBURG, PA.—The Pittsburg Time and Signal Company recently presented an application to the City Council of Allegheny for a franchise to almost unlimited rights for building lines for time and signal service as well as telephone and telegraph purposes. It was referred to the city solicitor and a sub-committee.

NASHVILLE, TENN.—The Tennessee Telephone and Telegraph Company made application to the City Council for a franchise for a telephone system, promising cheaper service. The company is said to be backed by local capitalists, but there are rumors that Harvey Myers, of Covington, Ky., is also behind it.

DALLAS, TEX.—Joseph D. Lloyd, of Wilkesbarre, Pa., of the Independent telephone company that asks a franchise on which to operate in Dallas and from this city over Texas, has endeavored to get the Dallas City Council to grant the privileges his company needs. Mr. Lloyd has placed $5,000 in the hands of the city authorities as a guarantee that the company he represents will operate a telephone system in Dallas if granted a franchise; otherwise, the money is to be forfeited.

SPOKANE, WASH.—C. H. Merriam, of this city, representing the Telephone Company of America, which he claims has a backing of $250,000,000, will ask for a franchise from the City Council.

OSHKOSH, WIS.—A. B. Ferdinand, representing the Winnebago Telephone Company, has been granted a franchise to lay a system of underground conduits on certain streets of the city. Under this franchise the company will go ahead and construct a local telephone system. It applied before for a telephone franchise, but was refused on the ground that a franchise was not necessary to enable a company to operate in the city.

WAUSAUKEE, WIS.—The Wausaukee Telephone Company has filed a petition for a franchise to build a toll line into Marinette. The company is extending its line from Coleman, through Crivitz to Marinette.

ELECTIONS.

ROANOKE, ILL.—The board of directors of the Roanoke Telephone Company have elected the following officers: David Schertz, president; J. C. Scoon, central manager; Benjamin Leyman, secretary.

SWEETWATER, ILL.—The Sweetwater Telephone Company has elected the following officers: W. R. Grimsley, president; J. W. Tehrune, vice-president; John Brasfield, secretary; A. D. Alkire, treasurer.

CUMBERLAND, MD.—DeWarren H. Reynolds, G. W. Randall and Urner G. Carl went to Hyndman recently and in company with B. F. Madden, of Bedford, held a stockholders' meeting of the Western Maryland and Hyndman Telephone Company, and all the aforegoing gentlemen, together with James A. McHenry, of Cumberland, were elected a board of directors of the company. The board of directors then organized by the election of De-

THE WEEK'S MESSAGES—Continued

Warren H. Reynolds, president of the company, and Urner G. Carl, secretary and treasurer. A modern thoroughly equipped and efficient telephone service will be installed between Cumberland and Hyndman by April 1.

ALLIANCE, OHIO.—The following officers of the Federal Telephone Company were in Canton recently at the annual meeting of the Stark County Telephone Company: F. S. Dickson, James B. Hoge, W. L. Carey, R. W. Judd and Maxime Reber. This company is owned by the Federal Telephone Company. The following officers and directors were elected: President, F. S. Dickson; vice-president, H. A. Cavanaugh; treasurer, R. W. Judd; secretary and manager, A. S. Hillhouse. The first three, together with the following, make up the board of directors: Maxime Reber, James R. Hoge, W. L. Carey, R. S. Shields, A. Dannemiller and Ferdinand Herbruck. It was decided to spend $48,000 in development work.

GALLIPOLIS, OHIO.—A telephone company organized to construct a line from Cadmus to McDaniel, elected the following officers recently: Frank McDaniel, president; A. F. Clyse, secretary; W. L. Eakins, treasurer; Wm. Canterbury, lineman.

COMBINATIONS.

PAW PAW, ILL.—The Northern Illinois Telephone Company has purchased the Lee County Telephone Company, whose headquarters are at Paw Paw.

ARGOS, IND.—A deal has been closed by which Edgar Metheny becomes owner of the local telephone system, succeeding J. F. Zehner.

IOWA CITY, IOWA.—C. H. Brown, of Grinnell, who, with others of that city, has bought out the Johnson County Telephone Company, is in the city. A. T. Presson has taken stock in the new company and will remain in the city as manager. The company will be known as the Iowa City Telephone Company.

DURHAM, MO.—At a recent meeting of the four Independent telephone companies of this place they were consolidated into one company, to be known as the Independent Telephone Company. The directors are: William Abel, John Pulliam, J. G. Humphrey and Eli Garkey.

TILTON, N. H.—G. Henry Davis, who owned the Tilton and New Hampton telephone line, has gone out of the telephone business and discontinued his service in the town of Sanbornton, New Hampton and Bristol. The Citizens' Telephone Company has purchased the poles, wires and instruments of Mr. Davis and intends to re-establish telephone service over its system in these towns.

FREEHOLD, N. J.—The Monmouth County Telephone Company, with headquarters here, has purchased Charles E. Leonard's telephone line from Atlantic Highlands to South Keyport. This is a part of a plan to connect those places with the lines from Freehold.

BALTIC, S. DAK.—As the result of a meeting of the Farmers' Mutual Telephone Company of this place it was decided to consolidate the local line with the one at New Hope and incorporate the two under the name of the Baltic and New Hope Telephone Company. An effort will be made to secure connections with the new telephone system now being established in Sioux Falls.

CONSTRUCTION.

SOLOMONVILLE, ARIZ.—In the extension of the Gila Valley telephone line to Globe work is progressing as satisfactorily as can be expected. Mr. Whalley, the manager, is unable to secure poles as promptly as he would like, but baring accidents they should arrive on the ground in a short time. Upon their arrival active construction on the system will be pushed and the connection with Globe made at the earliest moment. The improvement will place that splendid mining camp in easy telephonic communication with all parts of the Gila Valley and also with Clifton and Morenci. The line connecting the Black Warrior with Globe will also be one of the new changes.

HALIFAX, N. S., CAN.—The extensions and improvements to be made by the Eastern Telephone Company in Cape Breton will cost $60,000.

DUBLIN, GA.—The stockholders of the Macon and Dublin Telephone Company are preparing to greatly improve the service. A new copper metallic wire will be at once strung between Dublin and Macon, and a new wire will be strung between Dublin and Sandersville. When the improvements have been made there will be two wires between Dublin and Macon.

NAUVOO, ILL.—The people of Nauvoo and vicinity have subscribed $200 from Dr. Bortz for the extension of his telephone line to Fort Madison.

OTTAWA, ILL.—The Independent Telephone Company will construct a line to Grand Ridge and install an exchange there to handle the rural lines.

PIASA, ILL.—The Piasa Telephone Company and the Medora Telephone Company recently discussed the project of constructing a toll line from Medora to Brighton.

NEW CASTLE, IND.—The New Castle Telephone Company will shortly install a 1,000-line switchboard and a desk to match.

AURELIA, IA.—The Northern Telephone Company, of Fonda, which has been operating an exchange here for the past two years, will add five farm lines to the exchange early this spring.

FINCHFORD, IOWA.—The Finchford and Janesville Mutual Telephone Company will soon order poles and other material for extending in the spring.

BALDWIN, KAN.—The Baldwin Telephone Company has completed arrangements for connecting with the Topeka system by way of Onerbrook. Construction is expected to begin in April.

GREAT BEND, KAN.—A representative of the toll line company which will build a line throughout the western part of the State connecting all important towns with Kansas City, was here recently making a contract with the local company to connect with the new line. It will be necessary to change the style of the instruments to be used so as to enable the local subscribers to have direct connection with this service. People of the western towns of the State are greatly pleased at the outlook for securing this long-distance eastern connection.

OSBORNE, KAN.—The stockholders of the Osborne Telephone Company have decided to change the Osborne system from the present automatic to the manual system. The change will be made as soon as arrangements have been completed. The new switchboard will be of the latest up-to-date pattern and will be large enough to accommodate all who desire telephones. The central office will probably be moved from its present room to a more suitable location.

OTTAWA, KAN.—The Ottawa Telephone Company has secured material for extending its lines to Centropolis, and will begin construction soon.

ST. FRANCIS, KAN.—The Nebkanrado Telephone Company is a new organization that is putting up a telephone line from Haigler, Neb., to Jaqua via St. Francis.

HILLSBORO, KY.—The Hillsboro Telephone Company is preparing to extend its lines from Hillsboro to Sunset, Fleming County, and will probably build a line to Grange City.

GRANBY, MASS.—The new Granby Telephone Company, which was recently organized, will construct about eight and one-half miles of line from "Five Corners" to Ludlow City.

DETROIT, MICH.—A new telephone company for Detroit, backed by the Independent interests in Michigan, is what J. W. Martin says will be organized within a short time. He states that work will be started in a short time on an Independent toll line from Pontiac to Detroit, taking in Birmingham, Troy, Royal Oak and Highland Park on the way, and that he is so confident the People's company will complete its plant, he has arranged to make a 30-year contract between it and the new Detroit-Pontiac line.

GRAND RAPIDS, MICH.—C. E. Tarte and Albert Stacey, of the Citizens' Telephone Company, are in Battle Creek for the purpose of conferring with the officials of the Calhoun County exchange in regard to contemplated improvements and extensions of the service. The exchange is now engaged in underground work in Battle Creek and will put in a new section of switchboard, which will greatly increase its capacity. It is estimated that fully $40,000 will be spent this year in improvements and extensions by this exchange.

LANSING, MICH.—The poles for the extension of the Citizens' Telephone Company's line from Lansing to Grand Ledge have all been set, and the construction gang has started stringing the wires from this end. Wires have already been strung from Grand Ledge to Portland.

MENOMINEE, MICH.—The Menominee Range Telephone Company will extend its line from Iron Mountain to Pembine and will establish a local exchange there.

INDIANA, PA.—The Farmers' Telephone Company of Indiana will build three additional lines in the coming few months. Richmond and Ord are to be connected and lines will be built from Marion Center to Dixonville and Decker's Point.

MANSFIELD, PA.—The Citizens' Mutual Telephone Company will construct additional lines from Rutland to Columbia Crossroads, from Rutland to Jobs Corners and from Rutland up Bailey Creek to connect with the Mansfield line.

CHARLESTON, TENN.—S. W. Shelton is constructing a telephone line from Raht to this place.

CABOT, VT.—The People's Telephone line is soon to be inaugurated, running from Lower Cabot to the Huston neighborhood in Walden and from there to connect with the line at Hardwick.

MISCELLANEOUS

COLUMBUS, GA.—The Columbus Automatic Telephone Company has applied for a charter in the Superior Court, through its attorneys, Goetchius & Chappell. Plans are now being prepared for the system which the company is to build in Columbus.

GILMAN, ILL.—J. H. Allen & Son, of Gilman, have assumed the lease of the Gilman and Onarga Telephone Exchange from I. W. Turby, of Onarga.

MACKINAW, ILL.—The Mutual Telephone Company, of Minier, has moved its central office from Minier to this town.

BOSTON, MASS.—The Michigan Telephone Company, of Detroit, has

THE WEEK'S MESSAGES—Concluded.

passed into the hands of the Old Colony Trust Company, of Boston, as receiver. On January 1 of this year the Michigan Company defaulted in the second installment of mortgage interest coupons, so that there was due for arrears of interest to the bondholders, represented by the Old Colony Trust Company, over $240,000 for interest. Don M. Dickinson and Leo M. Butzel, of Detroit, and B. M. Palmer, of Boston, asked for the appointment of a receiver. A. C. Angell, of Detroit, appeared for the Michigan Company and consented to the motion, which was thereupon granted.

PERSONAL

MAQUOKETA, IA.—Ben Woods, who has managed the Maquoketa Telephone lines for a couple of months, has gone to Sterling, Ill., to accept a new position with a telephone supply company. Mr. Paddock, the new manager, has been here since the first of the month.

DODGE CITY, KAS.—J. M. Sharp, manager of the local telephone exchange, attended the meeting of the Kansas Independent Association at Topeka several weeks ago.

TRADE NOTES

THE STANDARD VITRIFIED CONDUIT COMPANY, New York, is sending a handsome little souvenir to its patrons and friends. It is an ash tray made of tin heavily enameled, and bearing illustrations of the 1, 2, 3, 4, 6 and 9 duct conduit made by the company.

THE AUTOMATIC ELECTRIC COMPANY, of Chicago, has received an order for immediate delivery from the Imperial Telephone Exchange, which is managed by the Postal Department of the German Government, for 1,070 automatic telephones and switches to be used in extending the automatic telephone service in Berlin, the German capital. The exchange which is to be enlarged, has been in operation since May 20, 1900. It was built by the American Company, and operated until July, 1901, under the auspices of German telephone engineers, at which time it was purchased by the Government.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, of Chicago, Illinois, has recently shipped boards of various capacities to the following companies: Texas Construction Company, Port Arthur, Texas; Northern Indiana & Southern Michigan Telephone and Telegraph Company, Constantine, Michigan; Home Telephone Company, Waverly, Ohio; Twin City Telephone Company, Minneapolis, Minnesota; Citizens' Telephone Company, Coolville, Ohio; Paulina Telephone Company, Paulina, Iowa; Louisville Anchorage & Pewee Valley Elect R. R. Co., Louisville, Ky.; Northern Indiana & Southern Michigan Telephone and Telegraph Company, Centerville, Indiana; Ft. Wayne Eectric Works, Ft. Wayne, Indiana, and the Inter-Lake Telephone Company, Canandaigua, N. Y.

FRANK B. COOK, eight months ago decided once more to take up the manufacture of protective devices, distributing boards and cable terminals. He secured quarters at 240-244 West Lake street, Chicago, ordered machinery and made the necessary patterns and special tools. Considerable time was taken in these preparations, and Mr. Cook was not prepared to receive orders until about four months ago. Since that time the capacity of the Cook plant has been taxed by the many orders which have come in.

Prominent among the orders that have been or are being filled are the following: 62 cable terminals and protectors for the Kinloch Telephone Company, of St. Louis; 295 pole top terminals and 18,000 tubular line fuses for the Home Telephone Company, of Los Angeles, Cal.; 98 terminals and protectors for Home Telephone Company, Springfield, Mo.; 19,500 pairs of protectors with No. 4 main distribution boards for the Automatic Electric Company, 6,000 pair of these for the Home Telephone Company, Dayton, Ohio; 8,000 pair for the 5th Avenue Exchange of the Illinois Telephone Company, Chicago, and 5,500 pair for Citizens' Telephone Company, Grand Rapids, Michigan.

The North Electric Company, placed orders for distributing boards and protectors for exchanges at Wooster, Ohio; Eureka Springs, Ark.; Oneonta, N. Y.; Bellefontaine, Ohio, and two or three other points.

The Kellogg Switchboard & Supply Company, ordered about 9,000 pair of protectors, some 8,000 of which are for the Home Telephone Company, Los Angeles, Cal.

The Stromberg-Carlson Telephone Manufacturing Company placed large orders for No. 4 distributing boards and protectors among the exchanges equipped being United Telegraph and Telephone Company, Chicago; Glen Telephone Company, Johnston, N. Y.; Park City Telephone Company, Bowling Green, Ky.; Utica Home Telephone Company, Utica, N. Y.; Liberal Telephone Company, New Decatur, Ala.; Belmont Telephone Company, Martins Ferry, Ohio; Belmont Telephone Company, Barnesville, Ohio; Belmont Telephone Company, St. Clairville, Ohio; Belmont Telephone Company, Bridgeport, Ohio.

The Eureka Electric Company is also a large patron of Mr. Cook, having given several orders.

In addition to the above enumerated orders, many smaller ones were also received requiring a total for all orders of 110,000 heat coils, 240,000 carbon arrester plates and 61,000 tubular line fuses.

PLANTS FOR SALE

Advertisements under this head **$1.00** *for 25 words or less for each insertion. Prepaid.*

FOR SALE.—Telephone exchange, 250 to 300 telephones, connecting line between Independent systems of Iowa and Illinois, at New Boston. Will pay 25 per cent. Address J. C. THOMSON, Oakville, Iowa.

WANTED—300 drops or less, second hand American Express Metallic Circuit Drop. Address DROP, care AMERICAN TELEPHONE JOURNAL, 1263 Monadnock Block, Chicago.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

TELEPHONE SALESMAN wanted by prominent manufacturer; only those with experience on the road need apply; state salary, references and give full particulars. Address BOX 37, care AMERICAN TELEPHONE JOURNAL, New York.

POSITION as Superintendent constructing and equipping exchanges and farmer systems. First class work guaranteed. Moderate salary. References. Address G. N. CARTER, Alexandria, Indiana.

POSITION as superintendent or manager of telephone company. Eight years' experience in managing and building exchanges and toll lines. At present superintendent of construction, large Independent company. Best of references. Will be open for position after April 1st. Address Lock BOX 11, RECTOR, ARKANSAS.

WIRE chief, formerly in charge Bell exchange, 3,000 lines, New York, wants position as manager of 500 to 1,000 subscriber exchange. References. Address E. F. L., care THE AMERICAN TELEPHONE JOURNAL, N. Y.

POSITION as manager and engineer in exchange of 2,000 lines or less. Formerly wire chief in Bell exchange, N. Y., 3,600 lines. Address H. J. S., care AMERICAN TELEPHONE JOURNAL, N. Y.

AN ASSISTANT MANAGER from a large New York City (Bell) Exchange and competent Traffic Manager desires position away from New York City as manager or superintendent. Address "EX-BELL," care AMERICAN TELEPHONE JOURNAL, New York.

The American Telephone Journal

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THE TELEPHONE AT THE WHITE HOUSE—THE PRESIDENT'S PRIVATE BRANCH EXCHANGE

By Harold Bolce.

AT the White House the telephone is an important and indispensable medium for the transaction of an enormous volume of national business. During the Spanish War it was a vital factor in history making. In his message to Congress in 1898 President McKinley acknowledged the great service of the telephone and telegraph system at the White House, operated under the direction of an officer of the Signal Corps.

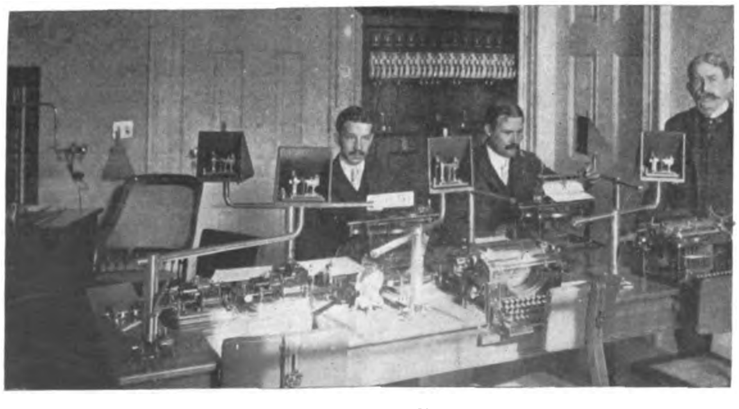
Since President Roosevelt has been at the head of the nation the telephone system, which was a special and favored feature of Mr. McKinley's White House arrangements, has been greatly amplified to meet the demands of the hour.

Sixty-five cables radiate from the new offices of the Chief Executive. The White House telephone exchange is a central office exclusively under Government control.

Its private wires connect with all federal officials and with every branch of the national government at Washington. The operators are government employes, and as none of the White House communications over the telephone to departmental officials pass through the city central office, any inadverent leakage or betrayal of confidence could be instantly traced.

WM. LOEB, JR.,
Secretary to the President.

Not a syllable of the half-million messages spoken annually over the wires has ever been divulged. President Roosevelt, who, as a modern man of intense activity, is a persistent patron of the telephone, has unquestioning confidence in the inviolate trustworthiness of the White House system. Matters vitally affecting the relationship of nations are discussed over the telephone as freely as they are broached in the sessions of the Cabinet.



WHITE HOUSE TELEPHONE AND TELEGRAPH ROOM.

The present telephone system at the White House, although under Government control, is owned by the local company. The Government pays annual rental for the wires and instruments. In installing this service the company acted under official instructions to equip the White House with the most complete system known to modern telephony.

The White House telephone exchange is never closed. This is also true of its telegraph office. Day and night the Executive Mansion is in touch with the entire official and commercial world and the wires are always kept busy. The ordinary reader, noting the reports of elaborate White House receptions, might imagine that the life of a President was largely a round of spectacular gayety, and that one of his most exacting duties was to stand and smile upon an almost endless procession of great men and radiant women.

A visit to the new offices of the White House readily convinces one that the American President is pre-eminently a man of vast practical activity, and that here, surrounded by clicking telegraphs and whirring telephones, he is presiding over the business office of the nation. It is only within recent years that the White House management determined to keep abreast, if not ahead, of the times in the matter of telephone and telegraph facilities.

During the Civil War, Mr. Edward Rosewater, now editor and proprietor of the Omaha *Bee,* had charge of the messages that came to the President.

"As I look back," said Mr. Rosewater, "it seems incredible that the Government had not then awakened to the necessity of running wires directly to the White House. All messages for the President were received in the offices of the War Department, and as we had no telephone then and the President was sometimes impatient of messengers, it was a common thing to see Mr. Lincoln walk into my office at all hours of the day and night. He would stand at my desk and wait for messages from the front."

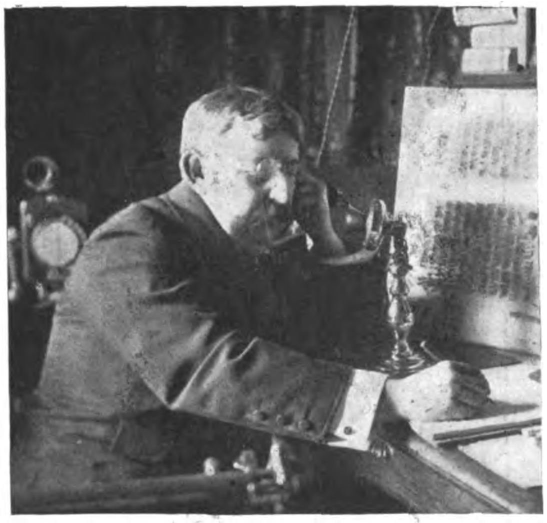
In striking contrast to this picture of Lincoln, striding over to the War Department and waiting around for messages, is the record of the way the Signal Service, by the use of the telephone and telegraph made it possible for President McKinley actually to direct the movements of fleets and battalions during engagements in the Spanish War. But for the unquestioned official reports it would tax one's credulity. The part the telephone played in accomplishing this extraordinary achievement is a matter of unique interest.

Then, as now, Captain Benjamin F. Montgomery, of the Signal Corps, a scientist and officer of unusual intelligence, was in charge of the White House telephone and telegraph system. He prepared elaborate maps of Cuba and adjacent waters, of Porto Rico, the Philippines, and, in fact, of all lands and seas on which American ships and regiments were operating.

At the front the "flying telephone" system under the direction of General Greely, Col. Samuel Reber and other Signal Service experts, followed both ships and soldiers, and in some instances led the advance. Everything known to the officers on the firing line was instantly communicated by telephone to the nearest telegraph instrument and thence by direct private wire to the White House.

On Colonel Montgomery's big war maps the movements of troops and vessels were indicated by pegs, and President McKinley, watching the progress of battles, sent direct commands to his generals and admirals. For the first time in American history the President, in the fullest sense, was enabled from his executive office to exercise his prerogative as Commander-in-Chief.

Not only did President McKinley's vigilant direction of the war render telephone service indispensable at the front, but it likewise made it necessary that he should never himself get beyond telephone call. Thus began the modern telephone service at the White House.



COL. BENJ. F. MONTGOMERY RECEIVING CONFIDENTIAL LONG-DISTANCE MESSAGE FOR THE PRESIDENT.

The night before President McKinley left Canton, Ohio, for the fatal trip to Buffalo, he called up the White House by long distance telephone and asked for definite data in regard to the service the telephone had rendered during the Spanish War. The facts were furnished him by telephone, and he embodied them in his famous speech at Buffalo.

Three minutes from the moment President McKinley was struck down at Buffalo arrangements were being rushed to establish an exclusive long distance telephone circuit between Secretary Cortelyou at the President's side and Assistant Secretary Benjamin Barnes and Colonel Montgomery at the White House. In less than fifteen minutes from the moment the assassin shot the President this long distance telephone was in use. It was over this wire that the first official details of the crime were received at the White House, and without interruption, day or night, this wire continued to convey telephone tidings of the stricken ruler, communications between Cabinet officers and general instructions relating to national affairs from September 6, 1901, to the moment the funeral cortege started to Washington.

It has been during President Roosevelt's administration that the White House telephone system was made a central office, absolutely independent of the city central. Four trunk lines connect the White House with the outside world, and they are kept busy. It is between the White House and the departments, however, on the exclusive lines that the great volume of business is transacted.

The Treasury Department, for example, has nearly 100 telephones. All these are directly connected with the White House, so that if the President or any member of the White House force wishes to speak with, say the Commissioner of Internal Revenue, the Director of the Mint, the Superintendent of the Coast and Geodetic Survey, or any other Treasury official, connection is made without delay and over wires entirely under government control.

In the same way all Senators and Representatives at the Capitol can be spoken to directly from the White House, and, of course, the State, War, Navy, Agricultural and Interior Departments, the Department of Labor, the Smithsonian Institution and, in fact, every federal branch is in constant touch by telephone with the White House. Thus, in the aggregate, in the White House telephone system there are several hundred miles of exclusive wire.

In the offices of the White House there are seventeen separate telephones. Secretary Loeb has a telephone at his desk through which he transacts much of the executive business assigned to him. His chief assistant, Mr. Barnes, who sits at a desk by his side, also has a telephone which begins ringing early in the morning and continues with little cessation until long after the close of official hours.

But President Roosevelt, while he uses the telephone a great deal, does not have one at his desk. When some Senator, financier or, perchance, some obscure citizen who has a communication which only the President can attend to, asks to talk with the President, Mr. Roosevelt leaves his desk, walks rapidly through Mr. Loeb's room and, entering the office of Colonel Montgomery, hurries into a telephone booth, closing the door after him. In such instances not even the White House operator listens to the conversation, so that only the President and the person at the other end of the wire are possessed of the information contained in their conversation.

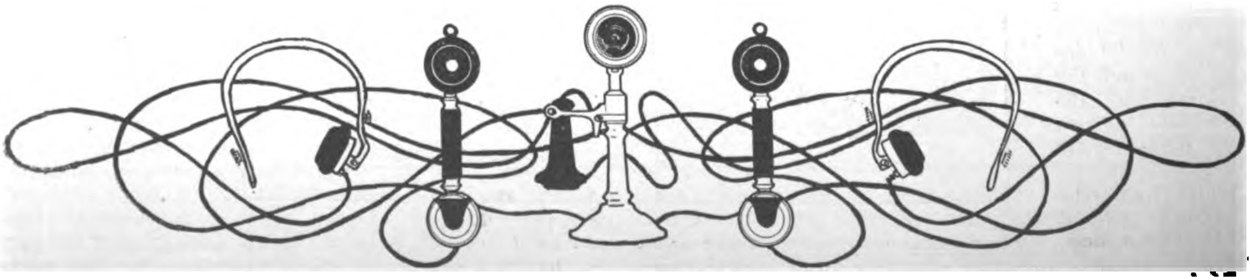
When the matter is not of such a confidential character, the President seats himself at Colonel Montgomery's desk and talks through that official's telephone.

The President is very frequently in conversation over the long distance with New York, Boston, Chicago and other cities. Before the coal operators and the miners agreed to arbitrate, Mr. Morgan on several occasions called up the White House from New York, whereupon conversation was established between the two most strenuous men of the day.

The social features of the White House are greatly aided by the use of the telephone. The President's wife and daughter are favorably committed to impromptu functions, the guests at which are almost invariably summoned by telephone.

When the President travels the telephone at the White House is kept exceptionally busy. From every city where the President stops word is at once sent by telephone to the White House, and the business of the Government is taken up and carried on with the same ease and expedition that would result if the President were simply telephoning from an adjacent room instead of from some point 1,000 miles distant from the Executive offices.

So important has it become that the President should maintain constant telephone communication with the Government at Washington that telephone terminals are put up in the car in which he travels, and wherever stops are made, even at small stations, the wires are quickly connected and the President enabled to talk with the White House generally getting connection with the long distance line, through the local exchange.



CONTEMPORARY CROSS TALK

By "The Listening Key."

THE improvement on the ordinary message rate tariff suggested in our last talk would be a very real and effective one; it would be in strict accordance with the facts of the telephone business, it would be a logical application of the minute-mile theory of telephone rates, and it would be good business from a purely commercial point of view, as it would give greater variety and elasticity to the tariff. When you come to analyze what goes to make up telephone service you find that your system, like all Gaul in the time of Caesar, is divided into three parts; the central office plant, the line plant and the subscriber's equipment. Looking at each of these in turn you find that only one has a definite unit, the subscriber's equipment. Here you have the telephone station—the only outward and visible manifestation of telephone service. The subscriber's equipment being the only outward and visible manifestation of telephone service, formed the basis of rates for telephone service in the days when telephone service began—in those dim days of the past when neither telephone men nor telephone subscribers knew what telephone service really was. The fallacy of considering the telephone station as the unit of telephone service has persisted to this day, not quite so much with telephone men as with the general public, but you will hear nine hundred and ninety-nine men out of a thousand talk of "putting in a telephone" and only the single odd enlightened one will talk of "telephone service."

Charge for Additions

It is curious to the careful observer to notice how tenaciously telephone men themselves cling to the subscriber's equipment as a unit, giving value to every detail of the outward and visible while completely ignoring larger differences in that which is of very much greater value. Lest that may sound obscure, the point in question is this: Most telephone men will charge an extra rate for an extension bell—to take the smallest addition to the unit of subscriber's equipment—but they will calmly swallow the fact that one subscriber has a line a hundred yards long and another a line a thousand yards long. Yet a hundred yards of line are worth more than an extension bell. However, the point at present under discussion is that in the subscriber's equipment we have a definite unit, and by common consent that unit is the ordinary wall set. Any variation on this or addition to it is charged for as an extra. In this country it has never been the practice to use more than one receiver. But in some countries two receivers are often used and the extra charges begin with the second receiver. If an extension bell is required there is an extra charge for that bell, if a desk set or any other special style of instrument, an extra charge; an extension station naturally has its regulation rate and when you come to a private branch exchange every item of equipment has its corresponding rate. So full honor is done to the outward and visible, and very properly so.

No Unit of Equipment

Now, skipping the line plant for the moment—we shall do full justice to it presently—we come to the exchange plant. Here there is practically no unit. The obvious reply to that assertion is that each line must have its jack and drop and must bear its share of switchboard frame, plugs, cords, keys, clearing-out drops, ringing plant and so forth. Just so; and in a small non-multiple exchange that is all very well, though even in a small non-multiple exchange the question is complicated by the fact that the full capacity of the exchange can never be used, that there must always be a margin of spare capacity, and also by the fact that the amount of plant in use is always changing, so that the average share of general plant to each line-drop also is always changing. However, we agreed that in small places the average method of determining rates and cost was the simplest and most practical. But when we come to a multiple exchange any real unit of equipment per subscriber vanishes amid a cloud of complications. The starting point to find a unit would of course be the answering jack and drop, with now the multiple jacks added. The number of multiple jacks per line naturally depends upon the number of sections and may be anything from two or three up to fifty or more.

Arguments in Bygone Days

This variable amount of switchboard plant per subscriber's line, so obvious in the case of a multiple exchange, was the favorite illustration trotted out in bygone days by telephone men in support of their favorite argument that the expense of operating a telephone plant increases, per subscriber, with an increase in the number of subscribers. This argument has never been anything but incomprehensible to the general public, and has always been scouted by the average business man, who, making deductions from his own experience and from general business experience, stoutly maintains that business on a large scale can be done at a cheaper rate per unit than business on a small scale. This perennial argument between telephone men and the public is but another illustration of the general tendency to base arguments on the outward and visible, and to fail to go to the root of the matter. Mr. Business Man saw nothing but his telephone station, and very excusably took that as the unit of the business, all the more excusably because the telephone man himself made the telephone station the unit and based all his rates on it. Even to-day, when the telephone business is pretty fairly understood by quite a number of people, there are telephone men doing the same thing and defiantly crying out to their customers, "Talk as much as you like."

What the Business Man Said

Mr. Business Man, then, when he saw the number of subscribers increasing and the rates going up, cried out: "Here, stop, with your business increasing your rates ought to be going down instead of up. What's the meaning of this outrage?" Then Mr. Telephone Man simply said that it cost more to serve a large number of subscribers than a small number. Mr. Business Man jeered, and said he knew better and so did every other business man; even his junior clerks knew that wholesale business was done at cheaper rates than retail trade. Then Mr. Telephone Man threw his multiple board at him and said: "Well, look at my exchanges and their multiple boards; immensely complicated things, multiple boards, and their cost increases in geometrical ratio to the number of subscribers. So of course it costs more to serve each subscriber of a large system than it does each subscriber of a small system." Now Mr. Business Man knew no more about the multiple boards than he did about the transit of Venus, and the mention of "geometrical ratio" reminded him distastefully of the fact that he had long ago forgotten all he ever knew of *pons asinorum* and quadratic equations. So, when he spoke plain English and was answered in Greek, he retired discomfited, angry and still unconvinced, feeling at heart that he was right and the telephone man was humbugging him.

He Doesn't Understand

Had Mr. Business Man been able to understand the telephone man's argument and analyze his illustration he would have been still further convinced that the one was wrong and that there was nothing in the other. But the telephone man was too wary, besides being too uncertain of his ground, to give figures in support of his argument. Had he done so the multiple board illustration alone would have quite failed to justify any subtsantial difference in rates between large and small systems. For instance, a multiple board for a thousand subscribers may be put roughly, for the sake of illustration, at $10,000, or $10 per subscriber and one for five thousand subscribers at $100,000, or $20 per subscriber. In the larger system, therefore, each subscriber's share of the exchange plant would cost $10 more than in the small system. Allowing fifteen per cent. for maintenance and depreciation and ten per cent. for interest and dividends, this would justify an addition of $2.50 to the annual rate. Even if the larger switchboard cost $20 per subscriber more than the smaller, an addition of but five dollars to the annual rate would be justified. Mr. Business Man was not raising a howl about any such paltry sum as five dollars, and if he had been able to understand the telephone man's multiple board argument and to analyze it he would have made things pretty hot for Mr. Telephone Man.

The Real Trouble

The whole trouble was that each was arguing from the outward and visible and leaving the fundamental principles untouched, those fundamental principles not being understood by either contestant. The business man took the telephone for the unit and went for the telephone man on that line. The telephone man had also always taken the telephone for the unit and when attacked found the position untenable. His outer works demolished, he took to his inner line of defences, retiring on his multiple board fortress and hurling Greek fire at the enemy. The enemy retired baffled and disconcerted, but feeling that right was still on his side even though he had no counterplay to the strange weapons of the defender. When the telephone man awoke to the fact that the message instead of the telephone was the unit of the business he sent out a flag of truce and a courteous letter of explanation. After that friendly relations began to be established and Mr. Telephone Man and Mr. Business Man began to come together. With the message as the unit the whole aspect of affairs was changed. The wholesale principle could be applied most perfectly and with delightful results, to the entire satisfaction of Mr. Business Man. Where he formerly paid grudgingly a few hundred dollars a year for telephone service, and cursed the service daily, he now pays thousands, does three-quarters of his business by means of the telephone service and says his morning and evening prayers of gratitude to the telephone every day. And Mr. Telephone Man himself would now be the first to smile at the idea of the multiple board being used as an argument to justify an increase of rate!

CANADIAN BELL ENDEAVORS TO MONOPOLIZE RAILWAY CONNECTIONS

AN article in THE AMERICAN TELEPHONE JOURNAL last week detailed some Bell methods in Canada and wound up with a short allusion to the fact that the Markham & Pickering Co-operative Company had been refused permission to place a telephone in the C. P. railway station because of the existence of a certain contract between the railroad and the Bell Company.

Word is now received from Toronto, Canada, that the Bell Company has been forced to the courts to explain this contract with the railroad.

In other words, the action is brought to test the legality of an agreement, of which a copy was produced in court, between the C. P. R. and the Bell Telephone Company, whereby the former company granted the latter the exclusive privilege of placing their telephone apparatus in their stations, in return for passes and certain other privileges which the railway company grants to the Bell Telephone Company. The agreement was dated May 1, 1902, and is to run for eight years.

The trouble occurred when the constructors of an Independent line between Markham and Whitevale endeavored to instal a telephone in the Locust Hill Station. The installation of a telephone there as the terminal of the line was declared in evidence to have been one of the principal objects in view in building the line, and without which the line would lose much of its value. The object of those interested in the line, who are mainly farmers and drovers, in having connection at the station, was to find out if cars had arrived from time to time for the shipment of stock, etc.

Outside of this agreement, the principal facts brought out in evidence were that the C. P. R. officials had positively declined to allow the Independent line to obtain an entrance to their station.

The principal clauses in the agreement between the two companies, which was produced without much objection from the counsel for the Bell Telephone Company, were as follows:

> The telephone company will furnish to the railway company at all points in the Dominion of Canada where it may now or hereinafter have exchanges, telephone connection between the offices and stations of the railway company and the exchanges of the telephone company free of charge. It will also issue to the officials of the railway company annual passes or franks good over the long distance lines of the telephone company, free telephone exchange connections, and maintain during the term of this contract a local exchange in the head office of the railway company at Windsor Street Station, Montreal, affording communication between the different offices therein, as well as with the said Local Exchange Telephone Company in the city of Montreal.
>
> The railway company will furnish annual passes to the officials of the telephone company for its own railway and telegraph lines, and the lines leased or controlled by the said railway company, and will also furnish free transportation to the employees of the telephone company over the said railway lines in Canada.
>
> The telephone company shall have the exclusive right of placing telephone instruments, apparatus and wires in the several stations, offices and premises of the railway company throughout the Dominion of Canada, where the telephone company has or may during the life of this contract establish telephone exchanges, it being understood in connection with new exchanges being established that the railway company will be given a fair service sufficient for its business.

NECESSITY OF INDEPENDENT TELEPHONE CONNECTION TO DETROIT BUSINESS MEN*

BY STANLEY E. PARKHILL.

DETROIT'S wholesale merchants, manufacturers and larger retail dealers are strangely indifferent to the value of connection with the Independent telephone companies of Michigan. Why they are not more active in favoring such connection and making an effort to secure the business that such a large system commands, is incomprehensible. Whether it is a case of Bell hypnotism, a complacent satisfaction in conditions as they are, a disinclination to make further effort to gain trade, or an ignorance of the situation, the result is the same. Detroit is asleep on the telephone situation in Michigan to-day, and congratulates herself that she has but one "bell" to disturb her slumbers. And yet she is not without excuse. Having been "done brown" by a gang of swindlers, it is but natural that she should be a little cautious and conservative.

The Detroit merchant sits in his office, his city is covered with a network of wires that bring almost any person he may want within call. He knows that there are wires radiating from the city in all directions and they bring him business. Detroit is the one stronghold of all that is left of the Bell monopoly in Michigan. Naturally he thinks the Bell must be the whole thing in the rest of the state. Yet if he will lift his eye, even to the horizon line, he will find Pontiac with more Independent than Bell telephones. He will find Utica, Oxford, Plymouth, Northville and Romeo with Independent companies, but with no Detroit connection. All these almost at his doorstep, and the farther his eye travels, the greater the number of Independent and the fewer the number of Bell telephones, until after crossing a line from Jackson through Howell and thence on to Saginaw and Bay City, the field is practically in the hands of the Independent companies.

Let me illustrate by comparison of the two systems in the territory occupied by the Union Telephone Company. We have exchanges in ten counties in the centre of the lower Peninsula extending from Durand to Ionia, and from Lansing to Harrison.

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*Paper read before the Convention of the Independent Association of Michigan, February 26, 1903.

In this territory, we are operating thirty exchanges, while the opposition has but six. We have exchanges in twenty-five towns, where the Bell has only toll stations. The Bell has four toll stations not reached by us, while we reach forty-nine towns and toll stations not reached by it. We are operating over three thousand telephones, where it has less than four hundred. In the twenty-five towns where it has no exchanges, we have nearly 1,500 telephones, and in the six towns where each company has an exchange, we have nearly 1,600 to its 300. In our territory we reach 1,300 business places, where it has less than 200. We have 629 miles of toll lines and 126 towns and toll stations.

While we are shut out of Detroit and kept away from the Detroit merchant, we are not cut off from the centres of trade. In fact we reach every other centre in the state, as well as Toledo and all important Ohio and Indiana cities, with better service and better equipment than the old line companies. Our company has no bonds and no debts. A large percentage of our subscribers are stockholders and our stock is held by trustees so we cannot be bought out or driven out of business. We have come to stay and we will continue to control the situation in our territory.

We are but a small percentage of the Independent system of the state with its 35,000 to 30,000 telephones, but our situation can be taken as representing the strength of the Independent movement outside of Detroit in the state.

The Detroit merchant knows that the telephone is invaluable as a means of trade communication. He also knows that he prefers to sit in his office and do his business, rather than go out to a toll station and wait from fifteen minutes to three hours for toll connection. The same is true of the thousands of country merchants who use Independent telephones. He is not compelled to trade with Detroit, though that city may be his natural market. He calls up Toledo, Cleveland, Grand Rapids, Jackson or Saginaw, and gets his emergency order filled without loss of time, and this ease of communication has opened hundreds of accounts that Detroit might have held.

We have been knocking at the door of the Detroit business man for two years. To all intents and purposes he seems unaware of our existence. When public meetings have been called he has allowed a mob of street ruffians to advise the city government, and the city government has acted on the advice. He has signed petitions asking that the Mayor veto ordinances, without any knowledge of the general telephone situation.

TELEPHONE USED TO PREVENT ACCIDENTS

In The American Telephone Journal of February 14 a method of employing a telephone and red incandescent electric lamp for preventing railway collisions was described. The system essentially consists of a third-rail or contact rail laid alongside the track, a telephone, electric lamp and bell in the engine cab, near the engineer. Midway under the forward part of the engine is hung the working instrument, which is connected with the telephone, lamp and bell. If, for any reason, there is danger ahead the bell rings and the red lamp lights. The engineer then brings his engine to slow speed or a full stop, and by means of the telephone can inquire the trouble.

A further improvement of the device sets the electric brakes on the train simultaneously with the alarm signal, which rings the bell and lights the red lamp, thus causing the train automatically to come to a stop. The apparatus is so adjusted that the engineer can at any time test it and satisfy himself that it is in working order.

The apparatus and its method of use is shown in the accompanying illustrations. Fig. 1 shows an engine equipped with the device, and also the third rail, which carries the necessary current. Fig. 2 is a view of the alarm sounding instrument, which is hung under the forward portion of the engine. A good view of the telephone instrument and the electric lamp and bell are shown in Fig. 3. The German and Russian Governments are making experiments with the apparatus with a view to its adoption on all their railroads. The above mentioned article describes fully, tests conducted recently in Germany.

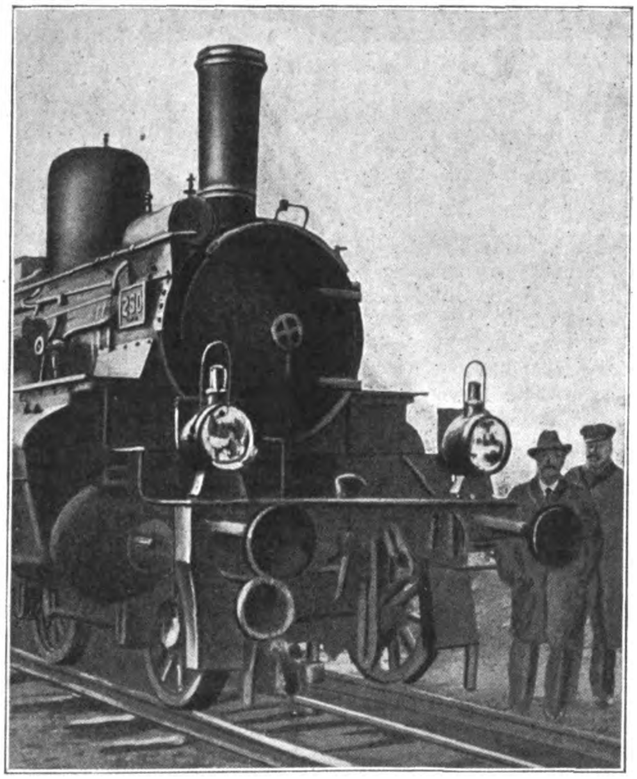


FIG. 1—ENGINE EQUIPPED FOR EXPERIMENTS, SHOWING THIRD RAIL.

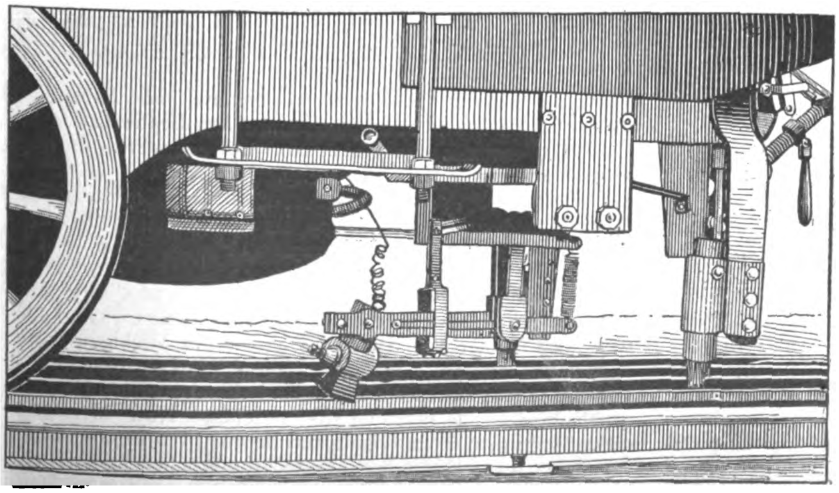


FIG. 2—THE THIRD RAIL AND CONTACT SHOE.

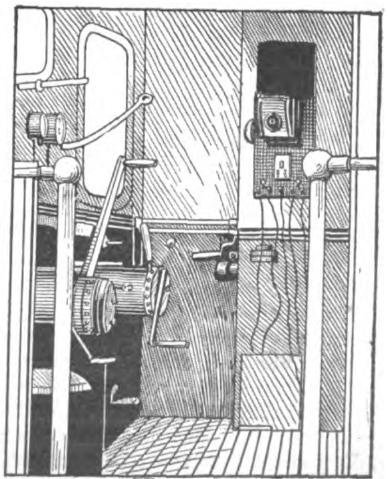
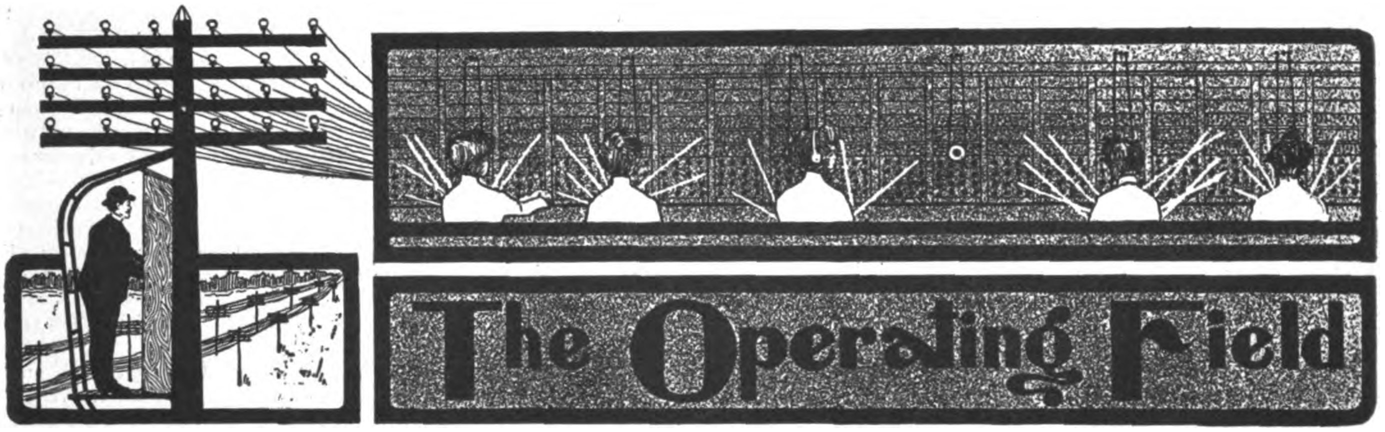


FIG. 3—TELEPHONE IN ENGINE CAB.



The Operating Field

A NEW COMPANY COMPLETED.

THE Jackson Home Telephone Company of Jackson, Tenn., is now giving service to its patrons, although only a portion of its subscribers are connected. There are now over 550 lines in operation.

The system is modern in every respect, and when completed will have required of the company an investment of more than $100,000.

The power is obtained from the wires of the Jackson & Suburban Street Railway Company, and is utilized through duplicate motor-generators in the exchange, supplemented by storage batteries of a capacity to operate the plant 180 hours.

The telephones, switchboard and exchange apparatus complete are supplied and installed by the American Electric Telephone Company of Chicago.

The local manager and superintendent is N. D. Smith, who has been in direct charge of affairs since September. Mr. Smith began his telephone experience as a boy carrying directories around to subscribers and has passed through the various stages of the business, filling every position up to general manger, becoming familiar with all the thousand and one details of telephone work.

The outside construction was done by Jones & Winters, of Chicago. Within the fire limits the wires are in conduits under ground. The overhead work is of high grade. The ultimate capacity of the system is 2,000 telephones.

Manager Smith states that as soon as the work is completed here they will begin the construction of country lines, building into suburban towns, and making connection with various city exchanges. One of the first will probably be with the Independent exchange in Memphis.

VICTORY FOR UNITED STATES COMPANY.

THE UNITED STATES TELEPHONE COMPANY, of Cleveland, Ohio, the long distance lines controlled by the Federal Telephone Company, has scored a big victory in Southern Ohio. It is announced that the company has strung its wires along the banks of the Miami and Erie canal as a result of an agreement with the Miami & Erie Canal Transportation Company. The fact that the United States company has made this agreement with the canal company probably accounts for the rumors emanating from Pittsburg and other points to the effect that the Elkins-Weidner syndicate had secured control of the United States company.

PENNSYLVANIA COMPANY TO BE SOLD.

THE franchises, properties and all assets of the West Penn Telephone will be sold at Washington, Pa., on March 24, at receiver's sale, for the purpose of satisfying the creditors of the company. This concern went into the hands of John M. Dunn as receiver several months ago at the instance of the stockholders, who asserted that the company was insolvent. A syndicate is now being formed which will purchase the property, put some new capital into it and make it a paying investment, as it should be under proper management, it having a very promising and populous territory for operation.

Receiver Dunn filed his first report in the Washington County courts, which recites that the company has 115 miles of line, chiefly in Washington County, but extending into Allegheny County and into Brooke County, W. Va. Mr. Dunn finds that the receipts from the operation of the line are only about $1,000 quarterly, and this is insufficient after operating expenses are paid to meet the interest on the indebtedness, which is something more than $23,000.

On arriving at the assets of the company, Mr. Dunn has estimated the value of the property of the concern not in use at Washington, McDonald, Burgettstown, Middletown, Claysville and Independence, at $1,234; the delinquent rentals collectable are estimated at $600, and current rentals due $680; though these two latter items may be reduced by receipts that may be produced by subscribers. The plant in operation, including exchanges at Independence, Buffalo, Pattersons Mills, Cross Creek, Washington, Claysville, Middletown, Taylorstown, Oakdale, Bethany, Midway, Burgettstown and McDonald, with switchboards and telephones, and the line itself are not estimated; but the audit of January, 1902, places its value at $33,000.

A GOOD TROUBLE SHOWING.

MANAGER C. E. NICHOLS, of the Kenton Telephone Company, of Kenton, Ohio, writes to THE AMERICAN TELEPHONE JOURNAL that during the winter he has had an average of only one line trouble per day.

"This," says Mr. Nicholas, "is due to the amount of cable work we did last summer. Our troubles with lines a year ago was about six cases a day for an exchange of 450 subscribers. We now have about 750 subscribers.

"We expect this summer to install about 9,000 additional feet of cable and cut over to all metallic lines. We are forced to do away with the grounded return, as the Electric Light Company is now installing a 75-volt A. C. series arc lamp system, and expects to have fifty lamps on the circuit and seventy-five on another. We concluded that by making metallic circuits now, it will not be so troublesome when we put in a central energy system later on."

HOW A MICHIGAN CO. WAS STARTED.

THE Kibbie Telephone Company, of Kibbie, Mich., which has been engaged since last September in building an extension in Kalamazoo has completed its work and opened up a toll office in that city.

The story of the development of the Kibbie Telephone company, as told by John H. Tripp, its manager, is interesting. Mr. Tripp is the postmaster, telegraph and railroad agent at Kibbie, and besides that runs a general store.

"The company was started seven years ago," he said in a newspaper interview recently. "It began in this way. L. F. Otis, who was formerly a representative in the Michigan legislature, runs a peach farm. He had a number of customers living in Illinois, where he used to live, and these customers would telegraph him every morning for peaches. Now Mr. Otis lives about two miles from Kibbie and he got tired of coming to town every day to see if he had any telegrams when he ought to have been picking peaches. The result of it was that he decided to build a line from his farm to Kibbie. I went in with him and

Charles McNett and W. D. Hall also ventured. After the plant was installed the result was that Otis and Hall got the best of the orders for peaches; the other peach growers found that they must do something, and a general meeting was held that fall, with the result that practically all the peach growers and farmers in the neighborhood went in.

"As first we built our lines cheaply. It was a daring undertaking. Some of our first poles only cost five cents apiece, but now we have good cedar poles, mostly. I helped put in the poles myself and I also attended to the installation. We now have about 1,400 miles of wire, nearly all metallic circuit, and our regular subscribers number about 700. We cover all southern Allegan county and Van Buren county completely."

The company was incorporated some time ago. Verne W. Tripp, president, and Harold J. Tripp, treasurer of the company, and sons of the postmaster, have been succeeded by S. M. Trowbridge, president, and Robert Adkin, treasurer, both of South Haven, John H. Tripp remains the manager. The other directors are Hon. H. M. Olney of Hartford, and Thompson Bixby of South Haven. The company is capitalized at $50,000.

CENTRAL UNION FRANCHISE WILL BE REPEALED.

THE franchise under which the Central Union Telephone Company operates in Moline, Ill., will be repealed.

Manager W. B. Roberts, of the twin-city district, announced at a recent meeting of the Moline Council the reply of the Chicago officials of the company to the demands of the council for certain concessions in the proposed new franchise ordinance. The reply was to the effect that the company is willing to give a bond to indemnify the city in case of claims for damages from accidents, but they will not concede the conditions stipulated by Mayor Wessel that the time limit of the new franchise be twenty years and that the company pay to the city two per cent. of its gross earnings for the first five years and three per cent. for the remaining fifteen years.

When Mr. Roberts had concluded it was decided to give City Attorney Kohler further time to prepare the repealing act. He left for Chicago, and on his return steps for repealing the ordinance under which the present franchise exists will be taken.

FRONTIER TELEPHONE COMPANY OPENING.

THE Frontier Telephone Company, of Buffalo, N. Y., formally began operation on Tuesday of this week. On that day the company was "at home" to all its patrons, their families and their friends.

The exchange was open to inspection between the hours of 2 and 6 in the afternoon and from 7 to 10 at night. Throngs of Buffalo citizens, subscribers to the Frontier service and non-subscribers, visited and inspected the plant. They were all pleased and went away with a feeling of pride in Buffalo's only up-to-date telephone system.

The Frontier Company has been serving some patrons in the downtown sections of Buffalo for several weeks. The formal opening was delayed, however, until everything was in thorough working order, so that there would be no possibility of a hitch.

The switchboard, telephones and apparatus were supplied by the Kellogg Switchboard and Supply Company, of Chicago.

CHARACTER READING BY TELEPHONE.

THE telephone reveals one's disposition. It exposes amiability or the opposite traits in a way that leaves one no chance to recover the lost reputation, says the New York *Sun*.

Persons who suddenly try to make their voices soft with amiability when they have learned who is speaking never deceive the hearer at the other end of the line. It is the first answer that reveals the character.

One reason for this attitude of mind on the part of the person called is the interruption of the other work. It often happens that he or she may be absorbed in something else. The first tendency is, of course, to answer gruffly the person who does intrude at such a juncture. And it takes a certain amount of breeding to compose one's self in order to answer amiably.

Only persons who take the trouble to think of others will make an effort to be polite when they feel in quite another mood. Thus is the telephone at the outset a test of manners.

It exhibits also the natural disposition. Persons who are always amiable and in gentle mood do not show that they are very much upset, even if they feel it, by the sudden ringing of a bell, which means that they are required.

The telephone voice may also express one's physical condition, as that is indicated by the nerves. Only a few months ago a man who had been for years extremely occupied by his affairs and devoted only to them, suddenly broke down, turned out to be a physical wreck and had to retire from all that remained to him of life. Most of his friends were astonished at this sudden breakdown.

"I knew that he was in a serious condition long before he ever consulted me," his physician said, "and I discovered his condition from his manner of talking over the telephone.

"No man who answered in that irritated, peevish fashion could possibly have been in good health. That voice showed exhausted nerves and physique. So I am not surprised to hear that he had succumbed entirely to overwork."

Thus the telephone is a measure of disposition, manners and health. Its greatest value lies in the fact that it takes a person off guard. The rush to answer the call generally allows little time to prepare one's self. So the real mood shows itself in the first "hello."

Practice, of course, changes all this. Increased frequency in the use of the telephone seems in some cases to have a stimulating effect on the nerves. The patience of the telephone girls who sit at the booths and switchboards is a rebuke to all those who are so emotional as to answer telephone calls in a voice that reveals their characteristics.

PITTSBURG AND ALLEGHENY PROSPEROUS.

THE PITTSBURG AND ALLEGHENY TELEPHONE COMPANY, Pittsburg, Pa., has issued a new directory, which shows that a large number of private branch exchanges have been established since the last issue. Among these may be enumerated the American Bridge Company, the Safe Deposit and Trust Company, the People's Savings Bank, the Farmers' Deposit National Bank, D. J. Kennedy, the Atlantic Refining Company, the Westinghouse Electric and Manufacturing Company, the Pittsburg Plate Glass Company, and the Pittsburg Valve Foundry and Construction Company.

The company has also, since the last issue, added exchanges at Sewickley, McKeesport and Turtle Creek. The book shows great growth in points outside of Pittsburg and Allegheny.

The Pennsylvania Railroad appears as a subscriber for telephones at its most important freight points. This is a most important gain, inasmuch as in all large cities Independent telephone companies have found it very difficult to convince railroads that they need more than one telephone service. In Pittsburg, however, the situation has forced upon the Pennsylvania Company a recognition of the need.

DIVER'S TELEPHONE SUCCESSFULLY TRIED.

SUCCESSFUL exhibitions of a diver's telephone equipment have been made at the Military Carnival held recently at Rochester, N. Y. The diver, Captain Sorcho, had a telephone set installed in his armor in the manner described and illustrated in THE AMERICAN TELEPHONE JOURNAL of December 6. It was connected with the exchange of the Rochester Telephone Company.

Captain Sorcho called central and asked to be connected with the city editor of a Rochester evening newspaper.

The bell rang in the newspaper office and the city editor was called.

"Hello," came the voice at first faintly, "is this the city editor?"

"Yes, who is this?"

"Oh, this is Captain Sorcho at the Carnival. I am talking to you from under eight feet of water. How can you hear?"

"All right, can you?"

"Yes. I have a connection with the Rochester Telephone Company's exchange, and it makes it very convenient. Just before I called you I ordered dinner for two at the Powers. Can't you come with me?"

"Thanks, but I have already dined," answered the surprised newspaper man. "An invitation to dinner from under eight feet of water. Well, well!"

"Well, some other time we can go out together, perhaps. If you come up to the show look me up. If I happen to be under water call me up or down," with a laugh.

"All right."

"Good-by."

"Good-by."

Opinion and Comment

A GRATIFYING EVIDENCE OF PROGRESS

NOTHING shows more clearly the strides made by Independent telephony than the present status of the telephone press.

When THE AMERICAN TELEPHONE JOURNAL entered the field in its present form, changing from a mere weekly budget of telephone items, to a modern, up-to-date technical paper, the most important publications in the field were the monthly journals. In little over a year's time, this has been changed entirely, so that to-day the monthly is as far out of the running, and means as little to the practical telephone operator, as the old horse cars, still to be found here and there, mean to the average urban dweller. Development is so fast, new ideas press so swiftly, important meetings are so frequent, that it is all a weekly can do to keep the pace, to print the matter important to the Independents while it still has timely value.

By the time a month has elapsed, the matter that has passed is ancient history, and new matter is pressing for publication. The best a monthly can do to-day is to present a rehash or echo of the weekly. This is a remarkable change to have occurred in a year, but that it has come comparison will easily show. Take, for example, the March issue of the monthly journal, *Telephony,* just out. This issue has as its leading article, the paper by Thomas D. Lockwood, read before the American Institute of Electrical Engineers on January 23, and published in THE AMERICAN TELEPHONE JOURNAL on January 31. Here the monthly was a month behind the current news, as it was handled in the weekly.

Two other papers, "The Necessity of Uniformity," by A. L. Hutchinson, and "The Relative Merits of Central Energy and Magneto Telephone Systems in Small Exchanges," by W. A. Taylor, read before the Wisconsin Association, that appear in the March number of *Telephony,* were published in THE AMERICAN TELEPHONE JOURNAL on February 21, nearly two weeks before the monthly, reprinting them, made its appearance.

The monthly also presented in its March issue, a report of the proceedings of the Wisconsin convention which had already been published in THE AMERICAN TELEPHONE JOURNAL on February 21, two weeks before. "The Life of Creosoted Telephone Poles," read by A. T. Kinsey before the British Institute of Electrical Engineers, was published in December. *Telephony* announces that it will publish a report of the Michigan Telephone Association meeting in its April number, which will reach the public about April 5 or 6, if the paper is on time. A full report of the meeting was published in THE AMERICAN TELEPHONE JOURNAL on March 7th, so that by the time *Telephony's* report is out, the matter will have been dead over a month. There is also in the March issue of the monthly a brief report of the Kansas Independent telephone meeting which had already appeared on February 28 in THE AMERICAN TELEPHONE JOURNAL. In its digest of patents, the monthly for March, shows patents issued February 10, February 3, January 27, and January 20. All these patents had been fully exploited with illustrations in THE AMERICAN TELEPHONE JOURNAL from two weeks to a month before.

As another feature of its March issue, the monthly presents "Telephone Protection," copied from an old number of the *Electrical Age.* These and an article on "The Present Extent of Wireless Telegraphy," copied from *The Review of Reviews,* which has, of course, no interest for telephone men, "The Autobiography of a Cedar Pole," which is a love story, and a few minor articles culled from various sources, were the best the monthly could offer after the weekly had swept the field clean, except that it had also a paper by William J. Hammer on "The Faller Automatic Telephone Operator," and a paper by Joseph B. Baker, on the Strowger instrument. Both of these papers had been offered to THE AMERICAN TELEPHONE JOURNAL and had been declined. Mr. Hammer's paper was rejected because he is an engineer who was retained by the Faller Company, and it was felt that his report on this machine, might show a bias in favor of his employer's production. Instead, the Faller machine was described for THE AMERICAN TELEPHONE JOURNAL on August 16, 1902, seven months before, by a man whose independence was to be relied on, as he had no alliance, either with the manual or automatic systems. The paper by Mr. Baker had also been offered and rejected for the same reason, namely, that Mr. Baker is in the employ of the Eastern Automatic, a branch of the Strowger Company. It has always been the policy of THE AMERICAN TELEPHONE JOURNAL to reject articles of this nature written by men whose judgment might be influenced by their affiliations.

The editor of this paper believes that he owes this much to his readers; that he cannot in justice to the men who buy and pay for the paper, offer either a paid write-up in the guise of regular reading matter as is freely done by other papers in the field, or carry any inspired articles, most of which are paid for at so much a line.

But this is beside the case. What we desired to point out was not our own superiority or the shortcomings of our neighbors. We simply present the facts shown to make clear the enormous development that has come in the Independent field, as a result of which the monthly publications that were adequate to keep up with and record progress a little over a year ago, are now utterly useless as trade mediums.

The telephone monthly, owing to this change, remains to-day, unread, generally unopened, because the men who receive it know from experience that it carries no matter that has not been presented long before by the weekly.

All who are interested in the growth of the Independent cause must rejoice at this condition. It means everything to those who can read the signs, for there is not on record another instance in the industrial world where a similar change has come so swiftly. The significance of this is submitted to our friends for use in pointing out the great strides the Independents have made in their fight against the Bell.

FOREIGN CURRENTS

By "The Arrester."

ANOTHER telephone cable has recently been laid down for a telephone circuit between England and the Continent this time between England and Belgium, and telephone communication will soon be opened between London and Antwerp and Brussels. The tariff for three minutes' conversation will also be two dollars, as in the case of the London-Paris line. The Belgium cable, however, is more than twice as long as the French, the distance from Dover to the point on the Belgian coast near Ostend where the cable is landed being over sixty miles, so that the new circuit will contain the longest submarine telephone cable in the world. The decision to lay the Anglo-Belgian cable was arrived at after careful experiments on the shorter Anglo-French cable, which has now been working satisfactorily for over ten years. If the line between London and Brussels gives satisfactory results the next step in extending the Anglo-Continental telephone system will be a cable between England and Holland, requiring a still greater length of cable, as the shortest distance between the two coasts is nearly a hundred miles. A telephone line between two such important financial centres as London and Amsterdam would be of great value, however, and no doubt it will be established before long. The long submarine cable across the North Sea is the chief obstacle and has prevented the proposal of a London-Berlin telephone line from being carried out. Over the short French cable talking has been carried on between London and Marseilles, 650 miles and it is hoped that London will be able to talk to Rome over the Paris-Rome line, a total distance of about 1,300 miles.

English Municipal Notes

Some idea of the breathless interest with which the progress of municipal telephony is watched in England may be gathered from the following paragraph in the London *Electrical Engineer* of recent date:—"The telephone manager, Mr. Mackay, in his last report stated that up to the present the contractors had excavated 202 feet of pavement and 1,013 feet of macadam; 508 pipes had been laid, and spots had been excavated for four manholes. Progress with the work has been rather slow, but taking the preliminaries into consideration, it was impossible to expect the same rapid progress during the first month as later on. The contractors had arranged to start two additional gangs in various parts of the town at once. The committee agreed to the purchase of certain necessary tools, to be purchased so far as possible locally. It has been decided to advertise for tenders for electric wiring the new exchange premises, according to the electrical engineer's specifications, and also to invite tenders for office furniture." Such feverish activity in the construction of a telephone plant was probably never before seen. It would be highly interesting to see the energetic contractor, under the watchful eye of the observant manager, excavating "spots" for manholes, and one feels a little natural curiosity about the operation of starting "*two* additional gangs in *various* parts of the town at once."

European Telephone Manufacturers

A few reports are published of the recent operations of some of the Continental telephone manufacturing concerns, which show that the European telephone business generally is not in a very flourishing condition. The French *Societe Industrielle des Telephones* had a less satisfactory period during 1901-1902 than in the preceding financial year. The gross profits amounted to $460,790, as compared with $772,850, and the net profits to $234,700, as against $544,500. A dividend has been declared at the rate of 12 francs per 300-franc share, or 6 francs less than in each of the two previous years. It was recently reported that the company had arrived at an agreement with the Government for the construction of a cable between Brest and Dakar, West Africa, at a cost of about $3,200,000, but it is not quite clear whether a contract has been made for this purpose. At any rate M. Richmond, chairman of the council administration, was apparently referring to this question when he informed the stockholders at the recent general meeting that perfect accord now existed with the ministry, and that the latter would do everything to bring the scheme to a successful issue, but that it was left to the Chambers, which would have to vote the necessary credits, to decide the matter. This company as may be gathered from the foregoing account deals largely in submarine cables as well as in telephones. Considering that the telephone business is almost stagnant in France, the company is fortunate in having an anchor to windward in the shape of a cable factory.

Berliner Telephone Works

In Germany, the Berliner Telephone Works Company, of Hanover, which was formed about five years ago, and as recently as September last increased its capital from $375,000 to $500,000, has experienced a disastrous year. In the first three years of its existence in its present form the company paid dividends of 12 per cent., 14 per cent. and 9 per cent. respectively, but any distribution for 1901-1902 is entirely out of the question. The accounts show as compared with the net profit of $51,980 a year ago, a loss of $17,280, which is partly met by the balance from the previous year and partly by drawing upon the reserve fund. The unsatisfactory results are attributed to a variety of causes. In the first place, the Berlin and Budapest branches did not receive the large orders formerly given by the Governments and the stocks at the latter branch had, after careful and fresh calculations, to be considerably written down. The manufacture of telegraph articles commenced by the Vienna branch required greater expenditure, and the report states that the branches in London and Paris, although exhibiting a continuous increase in sales, necessitated grants towards the cost of organization. The company's report further states that unfavorable effects were in general produced by home and foreign competition, although the circle of customers has been considerably extended and the manufacture begun of a number of new articles of apparatus.

In Sweden and Norway

The manufacture of telephones and telephone apparatus in Europe seems to centre in Sweden and Norway. In the other European countries telephone manufacturing seldom flourishes, even when carried on by companies with large capital and favorably situated with regard to extensive markets, like those whose reports are quoted above. In Great Britain there is hardly a telephone manufacturing company worthy of the name, and practically all of the telephone apparatus used in that country comes from America or from other parts of Europe. In France the old-style carbon pencil microphone transmitter is still in favor and the apparatus turned out is heavy, clumsy and expensive. In Germany the greater part of the telephone material turned out is as awkward as the language it has to handle, and neither France nor Germany do much trade in telephone apparatus beyond that which patriotism provides in the home market. In style, finish, efficiency and price the telephones turned out in Sweden and Norway seem easily to beat the products of other European countries.

Dr. Pupin's Formulae

A letter appears in the London *Electrical Review* commenting upon the recent experiments with the Pupin system. The writer, Mr. W. Moon, takes exception to some of Dr. Pupin's formulæ and points out that one gives the impossible result of the received current being entirely independent of the length of the line. The letter concludes with the following interesting suggestion: "The inaccuracy of the formula does not decrease the interest or value of Dr. Pupin's experiments, which have been confirmed by other experimenters. But while the addition of inductance coils to a circuit increases the loudness of speech, I think it will be admitted that it at the same time decreases the clearness of the speech by destroying the higher order of harmonics, and that a certain limit is reached, when an increase of inductance diminishes rather than increases the value of the circuit."

THE TOLEDO EXCHANGE*

By H. E. Adams.

TOLEDO was one of the first of the largest cities to have an Independent Telephone System, which for a number of years was operated by the Harrison Telephone Company. The stock in this company was slowly picked up by the Central Union Telephone Company, a Bell licensee, until that company had secured the controlling interest in the Independent plant.

About this time it became apparent to users of the Independent telephone, not only in the city of Toledo but in the state of Ohio, that the Bell interests dominated the Harrison Company, and as soon as it became an acknowledged fact that such was the case, Toledo citizens made application for another franchise, which they finally obtained through the aid of the Circuit Court, and immediately commenced the erection of the present Home Telephone Exchange.

The Harrison Company was operated until February of last year, at which time the Central Union Company announced through the papers that a large deal had been consummated and that it had purchased outright the Harrison Telephone Company and that service through this exchange would be discontinued upon a certain date. In the meantime, construction had progressed so rapidly on the new Home exchange that there was only a lapse of about seven months from the closing of the old Harrison Exchange to the opening of the new Home.

The new Home exchange was turned over by the construction company to the Home Telephone Company on August 10th, at a cost of $1,160,000. Service was first given on this date, with three thousand subscribers connected. The Toledo exchange was built for an ultimate capacity of 12,000 telephones, equipped for 6,000. The entire down-town district is underground, having a total of 387,897 duct feet of underground conduit. Besides the central office it also has an exchange in East Toledo, with an ultimate capacity of 6,000 telephones. In the main exchange Sterling equipment has been used—the telephones, however, being of Stromberg-Carlson make; the East Toledo exchange being Stromberg-Carlson throughout.

The growth of the Toledo exchange has been simply short of marvelous. As previously stated, the exchange commenced operation August 10th with 3,000 telephones in service and on February 10th, six months later, it had a total of 5,800 circuits, leaving but 200 circuits on its switchboards.

At the time the Toledo exchange was opened the Central Union Telephone Company claims 5,300 telephones, a great many of which were party lines, while on the same date, February 10th, 1903, according to its own claims, it had but 2,300. The above figures will show that while the Home Company has grown to the extent of 2,800 telephones, the Bell Company has lost more than this number.

The popularity of the Home telephone is readily illustrated by the statement of one of Toledo's prominent business men—which was that he had two Bell telephones in his store to one Independent telephone. For his own satisfaction he instructed the clerks to make note of all orders received over the telephone as to which they were received over, and he was somewhat surprised to find that at the end of the day he had received 84 orders over one Independent telephone to 41 over the two Bell telephones. It is needless to say that this man now has two Independent telephones and one Bell. Some of the large manufacturers have even taken out their Bell telephone entirely. One instance—the Milburn Wagon Works, which had formerly a private exchange of the Bell Company, to-day has no Bell connection whatever. While the Bell formerly had a great many private exchanges, it has to-day practically none in the business houses of the city of Toledo; it has been almost entirely superseded by a similar equipment of the Independent Company.

The present rates of the Independent company are $44 for business and $26 for residence, which, with a discount brings the net price to forty and twenty-four dollars respectively. Private exchanges are furnished for five numbers or over, at $40 per trunk line and $12 for each telephone.

Mr. Hamblin, the general manager, informs me that so far this year the average increase has been eighty-seven contracts per week. This work is being done by two solicitors and each week has shown an increase over the previous week.

It may be of interest to know the number of calls answered during a period of twenty-four hours in an exchange the size of Toledo's. It is the custom there to take a peg count once a month. On February 7th the counts showed that the operators answered 84,129 calls during the twenty-four hour period—the largest number of calls being between the hours of nine and ten A. M., namely, 7,963 calls. During the same twenty-four hour period there were 879 incoming toll line calls. This showed a net increase of total calls over the previous month of 6,130.

Owing to the rapid growth of the exchange in the city of Toledo, little attention has thus far been paid to farmers' lines, although many applications for this service have been received. Up to December 1st forty farmers' lines were in operation, the longest of which was thirteen miles. The largest number of telephones put on a farmers' line is four, all of which are central energy. The company will, this summer, build a great number of these lines, as it finds that they are not only a paying investment for the company, but are also an elegant card for increasing the number of subscribers in the city proper.

The toll line business is conducted principally over the United States Long Distance and the Northwestern Toll Line Company's toll lines. By the United States, points through Ohio and East and South, and points in Michigan are reached, and over the Northwestern, points in northwestern Ohio and Indiana.

Michigan toll line connections, however, are not as satisfactory as they might be. The toll line business into the state of Michigan could be quadrupled were connections to be had the same as in Ohio. The toll line business with the United States Company during the month of January amounted to something over $1,200 and is showing an increase of about 25 per cent.

Since being informed by Mr. Johnson that it was to be my pleasure to read a paper on the Toledo exchange I made it a point to talk with the leading business men in the different lines as to the prospects of trade, their toll line business, etc., with Michigan points, and find that they are enthusiastic over the prospects, inasmuch as they claim that with the Home telephone they are enabled to reach their customers in the smaller towns in their own stores, whereas, with the Bell company it was necessary to call them to the telephone, perhaps from a competitor's store, and pay a messenger fee.

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*A paper read at the Convention of the Michigan Independent Telephone Association, February 26, 1903.

Patents

TWO-WIRE SWITCHBOARD CIRCUIT.

William W. Dean, of Chicago, Ill., patents (No. 12,090), and assigns to the Kellogg Switchboard and Supply Company a testing system for telephone lines.

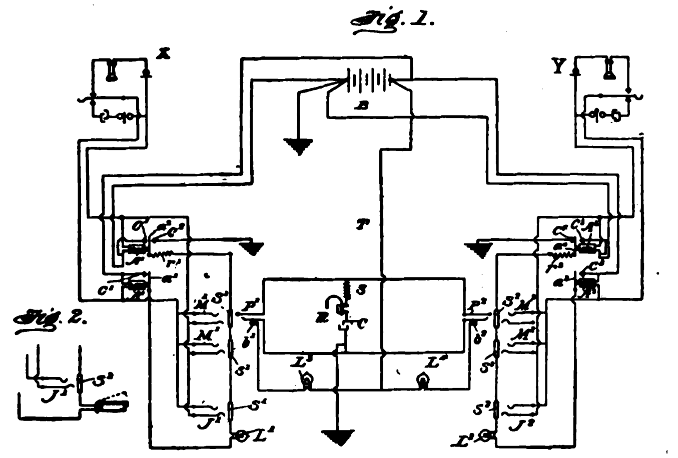
This patent is a re-issue of Mr. Dean's patent of last January, which was at that time fully described in our pages.

The object of this patent is to provide a simple and efficient common battery switchboard circuit, involving the use of two wires instead of three. In order to provide a busy test, Mr. Dean makes use of a separate relay in the cord circuit, which is fully described in our former issue.

COMMON BATTERY SWITCHBOARD CIRCUIT.

S. B. Fowler, of Morristown, N. J., patents (No. 721,882), a telephone system. The object of this patent is to provide a very simple and efficient switchboard circuit for common battery exchanges, and is shown in Fig. 1, which is almost self-explanatory.

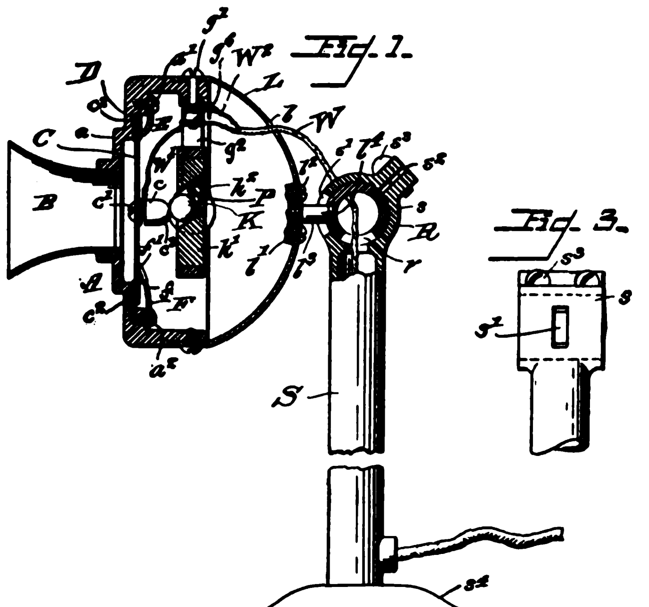
A feature of this circuit is in the method of providing the busy test, for as soon as the subscriber removes the telephone from the hook battery is thrown by means of relays A^1 to the rings of all the jacks of the line in question, consequently there can be no possibility that any other operator will take the line before the answering operator plugs in.



TELEPHONE TRANSMITTER.

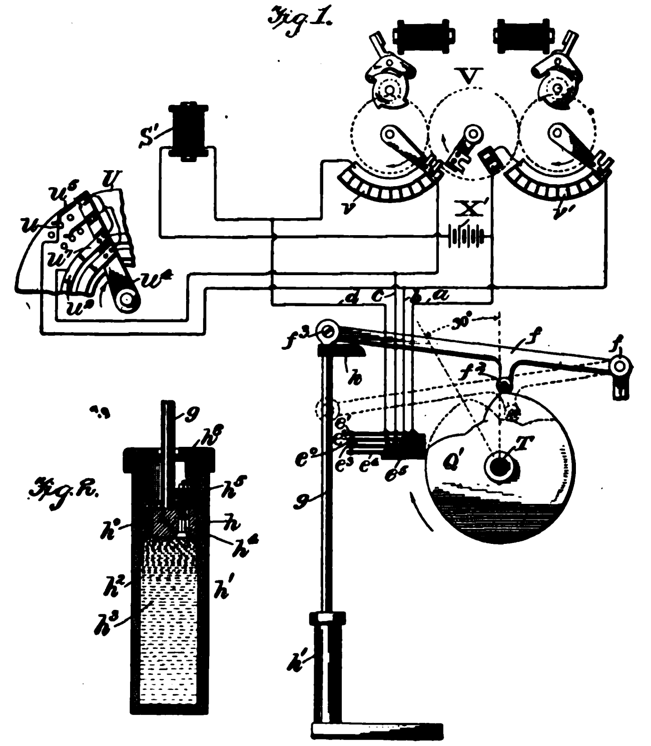
Charles Holmok, of Cleveland, Ohio, patents (No. 722,021), and assigns one-half to Walter Kroelling, a telephone transmitter. The object of this patent is to provide an improved transmitter. It is shown in Fig. 1.

The mouthpiece, front plate and rear case of the transmitter are similar to those in common practice. On the diaphragm *C*, a small piece of carbon with a hemispherical end is attached. Upon a plate *H* a block of carbon *P* is placed, through the center of which an inclined hole is drilled, and in this hole a carbon ball *K* is inserted. By gravity this ball falls forward and touches the head of the block and forms the loose contact required by a transmitter.



AUTOMATIC SYSTEM TROUBLE TEST.

F. N. Reeves, of New York, N. Y., patents (No. 721,742), and assigns to the Mechanical Improvement Company, of Charleston, W. Va., a trouble test for automatic telephone systems. The object of this patent is to secure a method for the detection of or indication of trouble in automatic switchboards, and is particularly designed and adapted for the Faller automatic operator. This patent is illustrated in Fig. 1. In the Faller operator every connection requires a complete revolution of a "Master Shaft." This revolution, under normal conditions, takes place in a certain definite time. Mr. Reeves puts a cam Q^1 upon the end of the Master Shaft upon the surface of which a roller, b^2 plays that actuates a lever *b* and shaft *G*. The end of this shaft is equipped with a piston that plays in a dash pot, shown in Fig. 2. By means of the fluid in the dash pot a certain length of time is consumed in the fall of lever *b*. If the connection is completed in the normal time, the dash pot prevents the fall of the shaft from closing the contacts e^2, e^3 and e^1, which sounds an alarm; but in case of accidents and the connection is not normally finished, the piston gradually settles in the dash pot and closes the contacts e^1, e^2 and e^3 and notifies an attendant.



AN IMPROVED TRANSMITTER.

Lemuel Mellett patents (No. 721,817), and assigns by direct and mesne assignment to the Microphone Transmitter Company, of Boston, a telephone transmitter. The object of this patent is to provide an improved transmitter particularly adapted to sound vibrations of all kinds, and thus give clear, distinct and louder transmission. The invention is shown in Figs. 1 and 2.

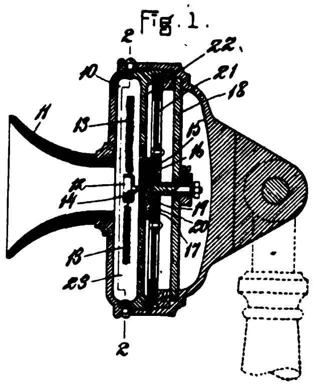


Fig. 1.

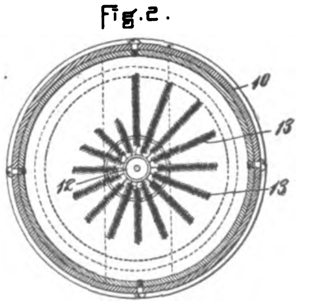


Fig. 2.

The inventor provides a series of radial spiral springs, placed on top of the diaphragm attached to the centre thereof and extending to the rim. These springs are of various lengths and are to be so made that they shall be attuned to vibrations of all of the various octaves in the human voice, and by this means reinforce transmission.

The Week's Messages.

NEW COMPANIES

IMPERIAL, CAL.—The Imperial Telephone Company has been incorporated with a capital stock of $25,000, all of which has been subscribed, in shares at $100 each—W. F. Holt, 246 shares; Fannie and Leroy Holt, 1 share each; J. A. Morrison, R. D. McPherrin, 1 share each. Place of business, Imperial, San Diego County.

HOPEVILLE, ONT., CANADA.—A meeting was held at Hopeville recently for the purpose of taking steps to form a telephone company. The meeting was largely attended, and those present were strongly in favor of the proposed line between Hopeville and Dundalk. Drs. Martin and Cunningham were appointed a committee to prepare a prospectus, and James Lamon, solicitor, has been authorized to get out the necessary papers.

COLORADO SPRINGS, COLO.—Local capitalists, prominent among whom are Frank G. Peck, James F. Burns and Irving Howbert and fifteen or twenty others, will file articles of incorporation with the Secretary of State in Denver for the Automatic Telephone Company. The capitalization will be $1,500,000 and the company proposes to establish a telephone system over the entire State of Colorado.

JACKSONVILLE, FLA.—The Indian River Telephone Company has been incorporated with a capital of $5,000, to build a telephone line from Titusville to Miami, by W. H. Harris and H. Jennings, of Tibbals, Fla.; Geo. E. Coon, Jensen, Fla., and A. C. Dittmar and G. S. Tucker, of Fort Pierce, Fla.

SPARTANSBURG, GA.—The Secretary of State has granted a charter to the Ennoree Bell Telephone Company; capital stock, $625. Incorporators: F. Engle, J. W. Allen, M. C. Poole.

RANSOM, ILL.—The Farmers' Mutual Telephone Company, of Ransom, has been incorporated with a capital stock of $2,500. Incorporators: J. R. Wormley, Oscar Strobel, Jacob Geheber.

TUSCOLA, ILL.—The Tuscola Telephone Company has been incorporated; capital, $5,000. Incorporators: Wilbur F. Murdock, F. P. Dowter, G. L. Chapman.

WOODLAND, ILL.—The Northwest Woodland Telephone Company has been organized, with N. A. Johnson, president; E. M. Bohl, secretary; C. M. Danner, vice-president; Thomas Sayers, treasurer.

ANDERSON, IND.—The Anderson and Fall Creek Telephone Company has filed articles of incorporation. The capital stock is $4,000, and directors are Winfield Scott, Harry Wertz, Haywood Scott, Josiah Larcher, Levi A. Harmeson, Thomas C. Langley and Charles R. Poindexter.

BRAZIL, IND.—A new telephone line, going south and east from town, is being built. The stockholders are: Dr. Gantz, E. A. Foulke, H. L. Campbell, Nick Mace, H. H. Longenecker, B. C. & R. E. Barnhart, J. H. Hopkins, Jeff Nicoson, D. H. Glass, J. C. Mitchell, George Mier, Wiley Pressnel.

FONTANET, IND.—The Merchants' Telephone Company has been incorporated with a capital stock of $5,000. The officers are: H. J. Lambert, president and manager; J. King, treasurer; E. King, secretary. H. J. Lambert, Ed. King and W. J. Randall form the board of directors.

FORTVILLE, IND.—The new Mutual Telephone Company seems an assured fact. Stock is being rapidly taken. A 200-drop switchboard and a full metallic circuit are proposed.

INDIANAPOLIS, IND.—The Posey Mutual Telephone Company, Switzerland and Ohio counties, has filed articles of incorporation. Capital, $10,000.

OAKLANDON, IND.—The Fisher's Station & Oaklandon Telephone Company has been organized, with a capital stock of $400. The incorporators are: Charles A. Ringer, W. L. Northam, Jacob Sarger.

SWEETSER, IND.—The Sweetser Rural Telephone Company has been incorporated, with $10,000 capital, to operate in Grant, Wabash and Miami counties. The directors are: James E. Garry, Finley H. Stevens, James Dooley, Thomas Johnson, Alfred Burge.

ADAU, IA.—Another farmers' mutual telephone company has been organized in Adair county. G. W. Rogers, president; Henry T. Miller, treasurer; Mr. Crowley, secretary.

BIDWELL, IA.—The Bidwell Telephone Company has been organized to build an exchange at Bidwell.

NORTH BRANCH, IA.—The North Branch Telephone Company has been incorporated. Capital, $5,000. C. Cope, president; O. C. Parsons, secretary.

JUNCTION CITY, KAN.—A company with a capital of $100,000 has been formed at Beloit, to be known as the Union Telephone & Telegraph Company. The Junction, Manhattan, Concordie, Abilene, Minneapolis and Beloit telephone companies take all the stock in the new company. The object of forming this company is to build three full metallic trunk lines between Abilene and Topeka to connect with lines between these places and Kansas City. Work on the new lines will commence before May 1.

RICHMOND, MASS.—The Richmond Co-operative Telephone Company has been organized. William H. Sherrill was elected president; Charles H. Dorr, vice-president, and A. Granville Sharp, secretary and treasurer. The sum of $1,000 was named as the capital of the company for building the initial line. The capital is to be furnished in equal shares by subscribers.

PATTEN, ME.—The Patten Telephone & Telegraph Company has been incorporated and is authorized to build its lines from Sherman to Eagle Lake.

LA GRANGE, MO.—A new company has been organized here for the purpose of running a telephone line to Weber. The directors are: John Yowell, William Porter, George Brown, John Brown, Henry Richter, John Waterman, Samuel Page, Henry Baker, William Clark, George Klusmeyer, Ben. D. Day.

MIDDLETOWN, MO.—Col. C. C. Momberger, northeast of town, was here recently in the interest of the new telephone company which was recently organized. Officers of the new company are: William Choagen, president; H. E. Burkhalter, vice-president; Charles Kraft, secretary; C. C. Momberger, treasurer.

MILLERS MILLS, N. Y.—The Millers Mills & Columbia Center Telephone Company has been organized, with the following officers: W. D. Gorsline, president; Isaac Casler, vice-president; John H. House, secretary; N. J. Harter, treasurer; J. W. Skinner, John C. Miller and Fred House, finance committee; George Hewes (three years), Isaac Casler (two years), A. V. D. Finger (one year), executive committee; M. M. Gay, general superintendent. The line is to be built early in the spring, and will cover a distance of three miles and will pass through a thickly settled farming country. With the installation of this line, the southern part of Herkimer will all be connected by telephone.

SPENCERTOWN, N. Y.—The Spencertown Co-operative Telephone Company has been organized, with H. W. Niles president and C. D. Higgins secretary and treasurer. It is intended to run a line from that village to Chatham, with several connecting branches. Work will be commenced at once.

APPLE CREEK, O.—The Franklin Union Telephone Company has been incorporated with a capital stock of $1,500. The incorporators are: Frank R. Beazell, H. B. Weier, A. D. Eyman, J. E. Franks, J. W. Tate.

COLUMBUS, O.—The Hoagland Run (Coshocton county) Telephone Company has filed articles of incorporation here, with a capital stock of $5,000. Incorporators: Andrew Reiss, F. M. Curtis, H. W. Soudles, Gideon Sheldon, C. D. Kaser.

DEERFIELD, O.—The North Benton-Deerfield Telephone Company, of Mahoning county, has been incorporated with a capital stock of $1,000. Incorporators: D. J. Miller, A. R. Cobbs, Geo. B. Kinsey, C. W. Hartzell, E. E. Walker, L. F. Pearce.

ELIDA, O.—The Elida Mutual Telephone Company has been incorporated with a capital stock of $21,000. Incorporators: S. D. Crites, L. M. Roush, R. E. Jones, David Culp, C. D. Brenneman, C. A. Shark, Wm. S. Peters.

HARPERSFIELD, O.—The subscribers of the Harpersfield Independent telephone line have decided to incorporate as the Harpersfield Telephone Company. About fifty telephones have been installed in a central station at Cork. The success of the movement has been so rapid that it is felt necessary to enlarge the facilities and provide for the expanding business.

POINT ROCK, O.—The Point Rock & Wilkesville Independent Telephone

Company has been incorporated with a capital stock of $4,000. The incorporators are: James Westfall, G. McLaughlin, George Barnes, A. W. Humphrey, E. H. Fletcher, T. B. Morris, Henry Geer, Walter Cooper, John L. Mark, W. R. Trainer, John H. Cottrill.

WELLSBORO, PA.—A telephone company, with S. L. Cummings as president, has been organized in Jackson township. It will build a line to connect with the line in the northern part of the township and other Independent lines.

YORK, PA.—The charter of the York Eastern Telephone Company has been recorded in the office of Recorder Bentz. The directors of the corporation are: A. M. Grove, M. H. McCall, Henry S. Merryman, John H. Wilson, B. F. Norris, Jos. A. Gaily and Calvin M. Shaw. The authorized capital is $8,000.

WAGNER, S. D.—The Wagner Co-operative Telephone Company, of Wagner, has been incorporated. Capital, $5,000.

BIG SPRING, TEX.—The Western Telephone Company has been organized by R. K. Kemp, C. L. Alderman and associates.

ALEXANDRIA, VA.—Judge L. C. Barley, of the Corporation Court, has granted a charter to the Mount Vernon Telephone Company, the purpose of which is to construct and operate a telephone line between this city and Mount Vernon. The capital stock is $5,000 and the officers are: J. N. Gibbs, president; F. H. Wilkins, secretary and treasurer; E. O. Thompson, C. Lukens and S. B. Moore, directors. All of the officers are residents of Fairfax county.

GLENWOOD, WIS.—The West Wisconsin Telephone Company, of Glenwood, has been incorporated with a capital stock of $5,000, divided into 200 shares of $25 each. Incorporators: Thomas Brockley, C. J. August and D. H. Syme.

GREENVILLE, W. VA.—The Monroe Mutual Telephone Company, of Greenville, has been incorporated. Capital, $8,000. Incorporators: J. M. Ballard, C. S. Whitton, J. E. Manor, A. L. Reed, J. A. Shanklin, of Greenville, and thirty-five other citizens of that vicinity.

FINANCIAL.

THORNTOWN, IND.—The Thorntown Telephone Company has asked to increase its capital stock, which is now $2,500, to $6,000, through the Secretary of State. William Brenton is president and George Lyster, secretary.

WINCHESTER, IND.—The Winchester Telephone Company has increased its capital stock from $2,750 to $25,000. Alonzo L. Nichols is president and J. A. Browne secretary of the company.

ROCKWELL CITY, IA.—The Central Telephone Company is reorganizing under the name of the Central Mutual Telphone Company to avoid confusion with other Central companies in the State. The capital stock is being increased to $150,000 in order to accommodate the greatly increasing business of the company.

WHITE BEAR, MINN.—The White Bear Telephone Company, of White Bear, has increased its capital stock from $10,000 to $30,000. J. H. Spink is president of the company and W. Murray secretary.

BILLINGS, MONT.—The stockholders of the Montana & Wyoming Telephone Company will hold a meeting in this city on April 4 for the purpose of increasing the capital stock from $40,000 to $100,000. The company is composed of several prominent citizens of Billings and Red Lodge. The increase in the capital stock will be for extensions and improvements. The company operates a line to Red Lodge, Gebo, Meeteetsee and other cities and towns, besides an exchange in Billings.

CAREY, O.—The Carey Electric Telephone Company has increased its capital from $6,000 to $25,000.

MARION, O.—The Marion Telephone Company has increased its capital stock from $100,000 to $250,000, of which $50,000 will be common and the rest preferred. The money obtained from the sale of the new stock will be utilized for the extension of lines. The company has nearly 1,200 telephones in use.

COCHRANTON, PA.—The Cochranton Telephone Company, which was organized one year ago by John H. Wright, of Spantansburg, Pa., has declared an annual dividend of 8 per cent. The company will build a number of rural lines in the spring and also a line to Meadville to connect with the Independent Company, of that city. Mr. Wright, of Spartansburg, and David Berringer, of Cochranton, are the managers of the company.

HARRISBURG, PA.—The Cumberland Valley Telephone Company has declared its first dividend of 1 per cent. The company, whose lines are controlled by the United Telegraph & Telephone Company, is connecting its lines in the Lykens Valley, Dauphin county, with those in Schuylkill county as far as Pottsville. The company's agents have been adding telephones rapidly lately.

EAGLE, WIS.—The Eagle Telephone Company has increased its capital stock from $3,000 to $30,000.

MEQUON, WIS.—The Mequon Telephone Company has increased its capital from $2,500 to $5,000.

RATES.

FAIRMONT, MINN.—At a meeting of the board of directors of the Fairmont Telephone Company it was thought advisable to advance the rates on rentals of telephones. On May 1 the raise of 50 cents a month will take effect.

ELECTIONS.

CHICAGO, ILL.—At a meeting of the stockholders of the Strowger Automatic Telephone Exchange, held at the offices of the exchange, in The Rookery Building, the following officers and directors were elected: Jacob L. Kesner, president; Max Sello, vice-president; L. M. Stumer, secretary; Joseph Siegel, treasurer; Adolph Nathan, Joseph Harris, A. G. Wheeler, Jr., E. W. Gearhart, S. Harris and the officers, directors.

HUNTINGBURG, IND.—At the annual meeting of the stockholders of the Dubois County Telephone Company the following were elected directors for the ensuing year: Henry Landgrebe, Phil. Dilly, Dr. C. R. Ramsbrok, Charles Moenkhaus and Ernest C. Dufendach. The directors have organized by electing Henry Landgrebe, president; Dr. C. R. Hamsbrok, vice-president; H. C. Rothert, secretary; Phil. Dilly, treasurer. The company is in a splendid condition, with excellent prospects for the future.

IOWA FALLS, IA.—The Central Telephone Company of Iowa held its annual meeting here and elected J. R. Skein, of La Porte, president; J. H. Funk, of this city, vice-president, and W. V. Shipley, secretary-treasurer and general manager. The company controls exchanges and toll lines that reach the cities of Iowa Falls, Eagle Grove and Hampton.

ANDOVER, N. Y.—The officers of the Andover & Whitesville Telephone Company are: E. M. Livermore; president; A. D. Howe, secretary; T. R. Bassett, treasurer; J. M. Green, Clark Rogers, G. H. McGee, directors.

DRYDEN, N. Y.—The directors of the Dryden & Virgil Rural Telephone Company elected the following officers: R. F. Saltsman, president; E. W. Lewis, secretary and treasurer; C. D. Griswold, W. B. McClintock and F. L. Stillman, buyers. Enough stock has been pledged to build the line between the two points, which will be about 7½ miles in length.

NEWTON FALLS, N. Y.—At the annual meeting of the Newton Falls Telephone Company the old directors were re-elected, as follows: H. H. Porter, F. W. Cory, C. M. Rice, C. F. Gardner and C. E. Fenton. The directors re-elected Mr. Porter president, Mr. Gardner secretary, and Mr. Cory manager.

COMPETITION.

JACKSON, MICH.—Pursuant to an order from the common council the Bell telephones in the city offices have been disconnected and the service of the Citizens' Company used exclusively. It is claimed that the Bell Company gives very poor service, and while it has of late spent considerable money in improvements, service over the Citizens' line is considered all that is necessary.

PITTSBURG, PA.—The Pittsburg & Allegheny Telephone Company has closed a lease with R. L. McCarthy for rooms in the National Bank of McKeesport building and will open a central exchange April 1. The company has one line into McKeesport, and within the next three weeks expects to have lines in operation from McKeesport to Pittsburg, when it is said a war will be declared on the Bell Telephone Company and telephone rates reduced from this city to McKeesport.

COMBINATIONS.

EATONTON, GA.—The Eatonton telephone system and branch lines have been purchased by Messrs. Henry Spivey and Roy Stubbs.

CRAWFORDSVILLE, IND.—The war between the two factions of the local co-operative telephone company has been declared off and all differences have been settled to the satisfaction of all concerned. All property rights of the old company have been merged into a new incorporated company under the name of the Crawfordsville Co-operative Telephone Company. The new company proposes to make extensive improvements. The lines will be extended and a new switchboard with 100-drop capacity will be installed as soon as it can be secured. A new board of directors has been chosen and the following officers have been selected: M. E. Clodfelter, president; William Sinnett, vice-president; Geo. F. Carver, secretary; Wm. H. Nicholson, assistant secretary; Geo. W. Bowers, treasurer.

HAMPTON, IA.—The Central Iowa Telephone Company and the People's Mutual Telephone Company are to be consolidated.

CHENANGO FORKS, N. Y.—At a recent meeting of the local telephone lines held at Chenango Forks arrangements were made for the consolidation of several companies under the title of the Chenango Valley Telephone Company. The lines consolidated are as follows: Castle Creek and Whitney's Point, Chenango Bridge and Castle Creek, Chenango Bridge and Chenango Forks, Chenango Bridge and Port Crane, Port Crane and Sanitaria Springs. A line is soon to be built from the Forks to Greene, and it is expected that this will also be merged with the others. A local line has been in operation from Greene down Page Brook for some years and representatives of this line were present, with a view to joining in the new

THE WEEK'S MESSAGES—Continued.

arrangements, but the matter was left for the directors to decide. It is also quite probable that the new lines coming in here will at least make connections with the Chenango Valley Company lines.

RAVENNA, O.—Arrangements for taking over the Independent telephone properties in Kent, Ravenna, Garrettsville and Mantua by the Portage County Telephone Company were completed at a meeting of the capitalists interested. The new company is capitalized at $100,000 and has a bond issue of another $100,000. The latter amount will be expended in making extensive improvements and extensions of the lines. The officers of the company are: F. E. Smith, president; H. L. Hine, of Mantua, treasurer; H. L. Beatty, of Ravenna, secretary. The main office of the new company will be in Ravenna. Included in the properties taken over are 150 miles of toll lines in Portage county. There are over 1,600 subscribers in the four towns. The new company has recently obtained a twenty-five-year franchise from the council of Garrettsville.

FRANCHISES.

COLORADO SPRINGS, COLO.—The Citizens' Automatic Telephone Company, the new company in the organization of which Frank G. Peck was one of the prime movers, will shortly present applications for franchises in the city councils of Colorado Springs, Denver, Pueblo, Cripple Creek, Boulder and ultimately to the councils of every town in the State where the Bell system is at present in operation. One of the features which the new company proposes to utilize in the construction of its system is the installation, in so far as is possible, of underground conduits.

CHAMPAIGN, ILL.—The Home Telephone Company has been granted a 30-year franchise. The Home Company agrees, within four years' time, to have all poles, wires, etc., in the fire districts taken down and replaced by an underground system. The rates to be charged must not exceed $30 per year for business houses and $18 for residences.

OTTAWA, ILL.—The village council of Grand Ridge has granted a franchise to the Home Telephone Company, of this city.

KOKOMO, IND.—The Sims Co-operative Telephone Company, of Sims, has petitioned the board of county commissioners for a franchise to erect its lines in Howard county. The petition is signed by H. M. Freeman, C. B. Knowlton, H. C. Haines, J. D. Garr, P. E. Johnson and Noah Zirkle.

WHITELEY, IND.—The city council of South Whiteley has received petitions from the People's Mutual Telephone Company and the Eel River Telephone Company asking for franchises to construct and install systems at South Whiteley.

KENOSHA, IA.—The Kenosha council has granted the Citizens' Telephone & Telegraph Company the right to construct and operate an Independent exchange.

MINDEN, IA.—The Shelby Independent Telephone Company has petitioned for a franchise in Minden and the town council will submit it to the voters at the annual election this month.

MORNING SUN, IA.—The question of granting a franchise to the Yarmouth Telephone Company will be submitted to the people of this place. The Morning Sun Telephone Company, now operating the exchange, has made the Yarmouth Company a proposition in reference to its coming in on the present poles and operating over the switchboard now in use. The Yarmouth Company refuses to consider its proposition and ask a franchise to put in its own exchange.

BOKCHITO, I. T.—The Choctaw-Chickasaw Telephone Company has made application to the council of Bokchito for a franchise for a telephone exchange.

PORTLAND, ME.—At a recent meeting of the board of aldermen the Northeastern Telephone Company was granted the right to erect about 800 poles and to build conduits nine miles long for the purpose of installing the automatic telephone system. In passing the order provision was made for a bond to be given by the Northeastern Company to be not less than $10,000 in amount and as much more as the mayor shall see fit to make it.

GRAND ISLAND, NEB.—The Home Telephone Company, through a local corporation, C. G. Ryan, G. B. Bell, F. W. Ashton and H. J. Palmer, applied for a franchise for the construction of another telephone system at a meeting of the city council. In the business portion of the city the wires will be underground. The franchise is to be accepted within ninety days and the system is to be in operation within two years. It contemplates connection with the Independent Telephone Company, in operation in other parts of the State. There is little doubt but that the franchise will be granted.

PERTH AMBOY, N. J.—The Hudson & Middlesex Telephone and Telegraph Company has asked for a franchise here. Ira J. Mandeville is vice-president.

PERTH AMBOY, N. J.—The People's Telephone Company has asked for a franchise here through its secretary, Joseph L. Dunn.

WOODSTOWN, N. J.—The Eastern Telephone & Telegraph Company, of Camden, has been granted a franchise in South Harrison township by the township committee.

BUFFALO, N. Y.—The right of way man of the Inter-Ocean Telephone Company has been busy securing the right of way from Dansville via Groveland Station, Groveland, East Groveland to Lakeville, and thus far has been successful in every case.

SARATOGA SPRINGS, N. Y.—The Saratoga Telephone Company, of Saratoga Springs, has applied for a franchise.

FORT WORTH, TEX.—The Fort Worth Telephone Company, represented by Sidney Samuels, has asked the city council of North Fort Worth for a franchise.

PRICE, UTAH.—A telephone franchise has been granted to R. W. Crockett and associates by the board of county commissioners. This is taken to mean the organization of a local exchange in Price.

LEGISLATIVE.

OMAHA, NEB.—The telephone committee appointed by the Commercial Club to assist the legislative committee in bringing about an equitable adjustment of the rates in the different cities and towns of the State held a meeting recently. The committee stated that it did not wish to advocate having a second telephone company in the city, but that it believes if the present rates are not lowered an Independent company will come in within three months. The committee supports a bill which was introduced in the Legislature naming a maximum rate of $5 per month for business houses.

WASHINGTON, PA.—The telephone bill introduced by Representative Campsey, of this county, in the Legislature will no doubt create considerable interest, especially in those communities where Independent companies are striving to gain a foothold. The object of the bill is to prevent or rather curb a monopoly of the telephone business, and the Independent lines say that if such a bill passes they will be able to give the people a much cheaper service. Of course, the Bell Company will oppose this bill, and the objection they will make will be on the ground that they have established a service and invested heavily in extending it and that new and Independent companies will receive the benefits, but these will not come without compensation. The passage of the bill would mean much for the people's interests, both in the way of cheaper rates and larger service.

LEGAL.

NEW BRITAIN, CONN.—Manager R. L. Andrews, of the Farmington Valley Telephone Company, and counsel for the company, Judge Roche, appeared before the judiciary committee recently in advocacy of the bill which will give the four minor telephone companies of the State the same rights and privileges now held exclusively by the Southern New England (Bell) Telephone Company.

WABASH, IND.—The Wabash Home Telephone Company has filed suit for $3,000 damages against the Wabash Electric Light Company, alleging that an improperly insulated live wire come in contact with the telephone wire below it, damaging the exchange so that operations had to be suspended for several weeks.

BUFFALO, N. Y.—A verdict for $5,000 has been returned against the Bell Telephone Company in Justice Lambert's Court in the suit brought by Gugliemo Marchesi for injuries sustained by coming in contact with a live wire that had blown down into Washington street during a severe storm. Marchesi sued the company in a former action for the death of his wife, who was killed in the same accident, and recovered $4,000.

LANCASTER, PA.—Mrs. Kate Stark, of Lancaster, has sued the Pennsylvania Telephone Company to recover $20,000 damages. During the blizzard last February Mrs. Stark's son was killed by coming in contact with a live wire.

UNDERGROUND

SIOUX CITY, IA.—The Sioux City Improvement Association has started a movement to have telephone, telegraph and electric wires in the fire limits of the city placed underground. Upon motion of E. J. Stason, the street committee of the association was instructed to request the city council to pass an ordinance requiring corporations using wires to place them in conduits under the ground, and to request the enforcement of the ordinance now standing which provides that all electric wires in the residence districts of the city shall be strung through the alleys instead of the streets.

CONSTRUCTION.

GREELEY, COLO.—The Morgan County Independent Telephone Company, whose principal operations have heretofore been confined to Morgan county, has decided to connect its system with that of the Northern Colorado Telephone Company in Weld county by building a double copper toll line between Fort Morgan and Greeley. It is the intention of the two companies to branch out and take in all of the territory in Northern Colorado, thus giving connections with all of the more important points in this section. The principal officers of the two companies are business men of Greeley.

PEARL, COLO.—A telephone line between Walden and Pearl is projected. Charles Snyder is back of the proposition, and promises to begin work on the new line in the spring.

THE WEEK'S MESSAGES—Continued.

CISNE, ILL.—D. D. Brock is putting up a telephone line which will join the Cisne Family Telephone Line.

HULL, ILL.—C. H. Rankin, of Fall Creek, will endeavor to establish a telephone exchange here in the near future.

ALEXANDRIA, IND.—The Delaware & Madison Counties Telephone Company followed up promptly the securing of a right of way for a line between this city and Summitville by beginning construction operations at once. The poles are now being distributed.

COLUMBIA CITY, IND.—The Columbia City Home Telephone Company will rebuild many of its lines and install a new switchboard and office outfit at a cost of over $5,000 during the coming season.

CRAWFORDSVILLE, IND.—The Co-operative Telephone Company is building another line from here to Thorntown direct.

SHELBYVILLE, IND.—The Mutual Telephone Company will soon install a new 100-drop switchboard.

BELLE PLAINE, IA.—The Pleasant Hill Telephone Company expects to extend a line to Belle Plaine in the near future.

HIAWATHA, KAN.—The new line of the Northeast Kansas Telephone Company, running southeast to Manville, is about completed. Another line has been promoted by J. W. Strahan, which runs east, connecting Mr. Portner, Mr. Strahan, Peter Harvey, Ernest Hazen, Steve Snyder, Robert McAtee, Boyd Betcher, William Morgan and others. This line will be built as soon as the material can be gotten on the ground. Another line that is being promoted is one out in the George Kelley neighborhood, which will be built this spring.

WILLIAMSTOWN, KY.—The Williamstown & Owenton Telephone & Telegraph Company is busily engaged in improving its line and in making new connections.

KALAMAZOO, MICH.—The Michigan Central Railroad is installing a private telephone system from Michigan City to Kensington. The work is being done by Trainmaster Wright, and is in the line of an experiment. Should it prove satisfactory, the telephone lines will probably be extended over the entire Michigan Central route.

KALAMAZOO, MICH.—Negotiations for the telephone plant which the new Citizens' Telephone Company announces it will install in Kalamazoo are pending, and it is probable the plant will be ordered in a short time. A temporary switchboard to accommodate perhaps 400 telephones will be installed very soon, with connections for the Kibbie lines and other outside Independent systems.

SAGINAW, MICH.—The Valley Telephone Company is establishing an exchange at Otisville. Millington is also to be connected with the Valley service and an exchange will be established there.

WINONA, MINN.—The Winona Telephone Company is planning improvements to its plant, to be made as soon as spring arrives. The improvement includes the stringing of more cable in the city and the extension of several lines in the country. The company will soon have 2,500 more feet of cable, which will be strung early in the spring. Within a few weeks past the company has installed a switchboard at Lewiston, and subscribers in that village and vicinity are now furnished with good telephone service. The company now has lines to both Lewiston and Altura and a portion of the distance out from each place. These lines are now to be connected, giving a through line between Lewiston and Altura. Another line that will be built early this season is one from Almon to Wyattville, in this county. Manager Otto Troost has been out on several country trips recently in connection with the extension of the service.

DURHAM, MO.—The four telephone companies which were recently consolidated into one company, called the Independent Telephone Company, will soon install a switchboard here. The directors are: William Abel, John Pulliam, J. G. Humphrey and Eli Garkey.

MILTON, MO.—The State Line Telephone Company will build a line from Milton to Cantril.

LISBON, N. H.—The Woodsville & Lisbon telephone line is to be extended to Sugar Hill.

ONTARIO, N. Y.—The Ontario & Steuben Telephone Company has voted to build a trunk line from Naples to Bath, with a branch to Wayland, and to increase its capital stock to $25,000. A local line to Italy is also contemplated to connect with lines from Penn Yan and Prattsburg.

RENSSELAER, N. Y.—The Home Telephone Company of Albany will begin work in the spring, it is said, building a telephone line on the East Side. The company received a permit some months ago from the common council, but up to this time had not started any work. It is the intention to put in several hundred telephones as soon as possible, and to have an exchange centrally located on the East Side. The line, it is said, will also run through Bloomingrove and Wynantskill and thence to Troy.

NEW CONCORD, O.—S. C. Herdman, president, and J. B. Rhodes, secretary and treasurer of the New Concord Telephone Company were here recently inspecting the plant, with a view to enlarging and improving it. The company, in addition to adding to the capacity of the exchange for new subscribers in New Concord, will extend its lines to accommodate the farmers throughout that section of the county. Among the proposed improvements will be the erection of a direct line from Zanesville to this place.

PORTLAND, PA.—The Sussex & Blairstown Telephone Company expects soon to extend its line to Columbia and also to connect at Portland with the Slate Belt line.

STEELTON, PA.—The Dauphin County Telephone Company has secured the right to run its wires through the works of the Steel Company and will establish an exchange.

IROQUOIS, S. DAK.—The recently incorporated Iroquois Telephone Company is losing no time in arranging for the construction of a telephone system at this place. The poles and other material already have been ordered. It is intended to begin the work of constructing the system as early in the spring as possible.

SMITHVILLE, VA.—The Central Telephone Company, formerly the Smithville & Drake's Branch Telephone Company, is extending its lines all over Charlotte county, and in a very short time the whole of the county will be in telephone communication with the county seat.

ASHLAND, WIS.—The directors of the People's Telephone Company, of Duluth and West Superior, are here in conference with T. C. Jacks, of the Ashland Home Telephone Company, to complete arrangements for a copper toll line between Ashland, the head of the lakes, and connect with the toll lines of the Independent companies at Duluth and Superior.

WIND LAKE, WIS.—A strong movement is on foot to extend the Wind Lake Telephone line to Burlington.

MISCELLANEOUS

CABERY, ILL.—The Cabery "Enquirer" thinks there is a good opening here for someone with a little money to invest, and suggests that someone establish a telephone exchange in the town. The "Enquirer" thinks that $1,250 would be sufficient and suggests that a stock company be organized.

MAROA, ILL.—The People's Telephone Company, of Maroa, proposes to place the system on the co-operative plan, and many subscribers are taking stock in the company at $50 a share.

CARBON, IND.—Representatives of the Citizens' Telephone Company of Brazil and the stockholders of the Carbon & Mansfield Telephone Company have perfected arrangements by which they will work together.

FAIRMOUNT, IND.—The Citizens' Telephone Company has purchased the telegraph poles formerly belonging to the Western Union Telegraph Company leading from the Big Four depot to the Oak Ridge Church, west of town, and will use them for its telephone line in that direction.

LOOGOOTEE, IND.—The Loogootee Telephone Company suffered a loss of $6,000 by the destruction of its central office by fire. There was no insurance.

VINCENNES, IND.—After much delay, the $5,000 bond of the Knox County Telephone Company has been filed. The bond was really filed several months ago, but the right of the company to operate in the city was contested, causing delay.

FORT MADISON, IA.—Dr. J. A. Bortz, of Nauvoo, Ill., was here recently consulting with the local manager of the Mississippi Valley central office relative to his line across the Mississippi River. The cable across the river is now being constructed under his own supervision. He is working eight men and pushing the work as fast as he possibly can. The cable will comprise two metallic wires and the line will connect with the Mississippi Valley Company and give to Fort Madison direct connection with many Illinois towns not now accessible by telephone. Dr. Bortz has about a hundred miles of telephone line in Hancock county, besides being in connection with a farmers' telephone company that takes in many country homes.

LE MARS, IA.—Secretary M. H. Harder, of the Sioux Valley Telephone Company, with headquarters in Cherokee, was in Le Mars recently conferring with Duke Naven and I. H. Mahan, of the Le Mars Telephone Company, in relation to connecting the lines of the two companies.

BOWLING GREEN, KY.—Nerge Clark, attorney for the new Independent telephone system now being installed in this city, has returned from Louisville, where he had been on business for his company. While there he closed a contract with the Home Telephone Company for a long distance service with the system here.

PADUCAH, KY.—General Manager R. E. Ashbrook, of the People's Independent Telephone Company, has gone to Memphis to arrange for long distance connections with the Memphis Long Distance Telephone Company, which has lines to St. Louis, Little Rock, New Orleans and other places.

CUMBERLAND, MD.—The Western Maryland Telephone Company has completed its service to Pittsburg, the line connecting with 117 cities, towns and villages between here and that city, which includes Somerset, Hyndman, Johnstown, Altoona and Brownsville.

CANTON, MO.—The Lewis County Telephone Company, of this place, is unable to meet the demand for telephones. The company is under the management of Mr. Hodges.

FREMONT, NEB.—The Arlington Telephone Company, which has 160

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telephones on its lines, is anxious to make a connection with the Fremont Company, and some kind of a traffic arrangement will probably be made in the near future. The Arlington Company has connections now with lines reaching to Blair, Kennard, Herman, Tekamah and Fontanelle. The Fremont Company has its work here nearly completed.

MORRIS, N. Y.—The Butternut Valley Telephone Company has strung a wire from Morris to Garrattsville for the use of farmers between these two villages.

UTICA, N. Y.—The Utica Home Telephone Company's lines will be ready for operation on March 16. It will start with about 1,600 telephones, nearly half of which are already installed. An Independent system is also being installed in the village of New Hartford. This system will be in operation about April 1. It will be connected with the Utica exchange. Superintendent Klein, who has charge of the work, has just completed two main trunk lines, one from Waterville to Utica and the other from Clinton to Utica. Five additional copper circuits are also being strung from Little Falls to Rome.

JOHNSTOWN, PA.—The Johnstown Telephone Company has extended its long distance connections, with toll rates, to Cumberland, Frostburg, Western Port and Lonaconing, Md., and Springfield, Romney and Martinsburg, W. Va., and within the next few weeks it is expected that connections will be made with all points along the West Virginia Central Railroad, in which region a number of Johnstowners are interested in mining and lumbering districts.

FOND DU LAC, WIS.—The Poole Bros.' general store and telephone exchange, at Armstrong Corners, were totally destroyed by fire. Loss, $7,000 to $8,000, with insurance in the Campbellsport Mutual and the Theresa Mutual companies for $2,800.

FOND DU LAC, WIS.—It is said a third bidder for the property of the Little Wolf River Telephone Company will be in the field when the sale is made at auction by Receiver F. H. Sweet, April 11. The new bidder, it is said, will be a representative of an Independent company, which is planning to establish an exchange in Milwaukee and in Oshkosh, and which wants Fond du Lac as a connecting link. The assets of the company are valued at $140,000 and the bonded indebtedness is $60,000. The property includes an exchange of 750 subscribers, 450 miles of toll lines, 75 toll stations and about 1,400 telephone instruments.

WEST SUPERIOR, WIS.—The Douglas County Telephone Company, West Superior, by B. S. Loney, president, and Lyman T. Powell, secretary, filed an amendment revising the section of the articles naming the officers and board of directors.

PERSONAL

CLEVELAND, O.—Along the lines of the proposed reorganization of the Federal Telephone interests, H. H. Robinson has been appointed general manager of the United States Telephone Company. Mr. Robinson will succeed Maxime Reber, who is vice-president of the company and who has been acting as the general manager. Mr. Robinson started in the telephone business in Chicago in 1896 as a clerk with the American Telephone & Telegraph Company. In October, 1901, he was elected to the position of general superintendent with the United States Telephone Company, with headquarters in this city, and in May of last year he was appointed assistant general manager. He is regarded as being especially efficient in long distance matters.

COLUMBUS, O.—O. C. Obetz, general manager of the Tuscarawas County Telephone Company, has resigned his position to go into business for himself. He and several associates have gone into the telephone directory business, with headquarters at Columbus.

TRADE NOTES

THE CHICAGO, UNION PACIFIC & NORTHWESTERN LINE runs three trains a day,— Chicago to California, Oregon and Washington.

THE COLUMBUS STORAGE BATTERY COMPANY, Columbus, Ohio, manufacturer of the hard-plate storage battery, has moved its business into much larger quarters, owing to the large orders recently received for its product. It now has excellent facilities for promptly filling all orders.

THE FARR TELEPHONE AND CONSTRUCTION SUPPLY COMPANY, Chicago, has just issued its new catalogue, No. 16, for 1903. Besides describing and illustrating over 500 telephones, switchboards, generators and general telephone and construction supplies, it contains a short history of the Farr Company, and illustrates several departments of the factory. It will be found very useful, especially to those contemplating the construction of small town systems and rural lines, because of the diagrams of connections and methods of construction given. This catalogue will be mailed to anyone writing for one.

A HAND BOOK OF TELEPHONES

By LIEUT. COL. SAMUEL REBER.

The Government Printing Office, Washington.

THIS volume comprises a set of very complete instructions for installing and operating telephones. While designed primarily for the United States Army it would be warmly welcomed by many an exchange wire chief, but as it is a public document, it cannot be obtained in the ordinary ways of the book store. There is little of telephonic theory, and nothing relating to apparatus construction, at least from the manufacturers' point of view. But it contains the clearest and most complete directions for setting up magneto sub-stations and small switchboards, of anything in print. Further, the prevalent telephonic diseases are diagnosed, and pretty complete prescriptions for their treatment given. To mention Col. Reber as the author will create a widespread desire to possess the volume, for the Colonel is well known as a telephonist with but few equals.

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FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

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Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

POSITION as INSPECTOR or TROUBLEMAN. Several years' experience and best of references. Address, BOX 38, care THE AMERICAN TELEPHONE JOURNAL, New York.

TELEPHONE SALESMAN wanted by prominent manufacturer; only those with experience on the road need apply; state salary, references and give full particulars. Address BOX 37, care AMERICAN TELEPHONE JOURNAL, New York.

POSITION as Superintendent constructing and equipping exchanges and farmer systems. First class work guaranteed. Moderate salary. References. Address G. N. CARTER, Alexandria, Indiana.

POSITION as superintendent or manager of telephone company. Eight years' experience in managing and building exchanges and toll lines. At present superintendent of construction, large Independent company. Best of references. Will be open for position after April 1st. Address Lock BOX 11, RECTOR, ARKANSAS.

WIRE chief, formerly in charge Bell exchange, 3,000 lines, New York, wants position as manager of 500 to 1,000 subscriber exchange. References. Address E. F. L., care THE AMERICAN TELEPHONE JOURNAL, N. Y.

POSITION as manager and engineer in exchange of 2,000 lines or less. Formerly wire chief in Bell exchange, N. Y., 3,600 lines. Address H. J. S., care AMERICAN TELEPHONE JOURNAL, N. Y.

AN ASSISTANT MANAGER from a large New York City (Bell) Exchange and competent Traffic Manager desires position away from New York City as manager or superintendent. Address "EX-BELL," care AMERICAN TELEPHONE JOURNAL, New York.

The American Telephone Journal

VOLUME VII. *SATURDAY, MARCH 21, 1903* *NUMBER 12*

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THE IOWA INDEPENDENT TELEPHONE ASSOCIATION'S SEVENTH ANNUAL CONVENTION

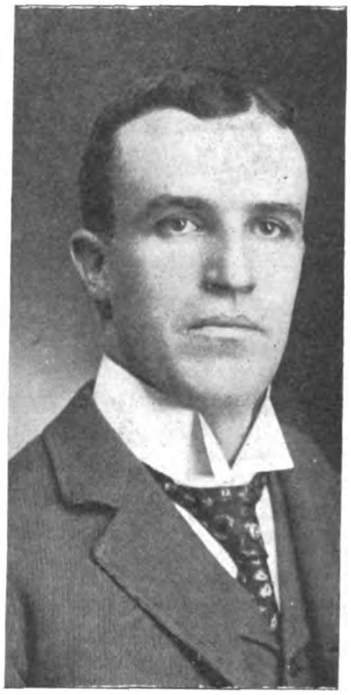
DR. H. S. HERR,
President.

THE Seventh Annual Convention of the Iowa Independent Telephone Association was held in the parlors of the Savery Hotel in Des Moines, Ia., Tuesday of last week, over one hundred delegates and thirty-five manufacturers and supply houses being represented.

The convention was the most enthusiastic and successful in the history of the Association, the membership being increased by twenty members and rules and resolutions being drafted that will do much to harmonize them in their fight against the Bell company,

The meeting was called to order at 3 o'clock p. m., by president U. S. Alderman, of Nevada, who made a brief but interesting talk. He said in part:

> Our main object in meeting here is to harmonize ourselves and to fight our enemies. We must get closer to each other if we wish to accomplish something. We must believe in and aid this association in a financial way if we want to fight our enemies. It is in the unity that we can give each other that we will be able to help each other. We should have more money in the treasury. We should have heavy funds for legislative purposes.
>
> It is in the legislature that we will accomplish our work, and while I decry the custom of lobbying, still under the present conditions we must lobby, and we cannot overlook that part of the work.



C. C. DEERING,
Secretary.

REPORT OF THE TWO DAYS SESSION

The report of the treasurer, C. C. Deering, showed that the association was in good standing. The totals were as follows: Assets, $606.51; disbursements, $223.65; balance on hand, $382.86. The auditing committee, composed of Messrs. Kirk, Griswold and Atkinson, recommended that the report be accepted, which was done.

B. J. Carney, of Grinnell, a practical lumberman, read a short but funny paper on "Cedar Poles," dealing with the subject in all of its phases.

He explained the methods of peeling poles, said that the fire killed and dead poles were brittle and not reliable and explained how the fire killed pole could hardly be detected from the green white cedar, the proper pole to purchase. The fire killed, he said, were rotten at the core and would break off. They are much lighter than the green cedar pole.

Wednesday morning's session was opened with the reading of the minutes, and the passing of a resolution of incorporation.

Miss Flora B. Herr, of Ottumwa, was introduced, reading a paper on the "Uniform System of Toll Accounts," which resulted in some discussion. It will be printed in THE AMERICAN TELEPHONE JOURNAL in a succeeding issue.

Mr. Bellamy, in the discussion following, asked that a committee of toll operators be appointed from Des Moines, Ottumwa, Fort Dodge, and Cedar Rapids and that the convention pay their expenses while they meet and draw up a uniform set of toll rules and check slips so that the Iowa Independent Telephone Association might work in unison in this valuable part of the business.

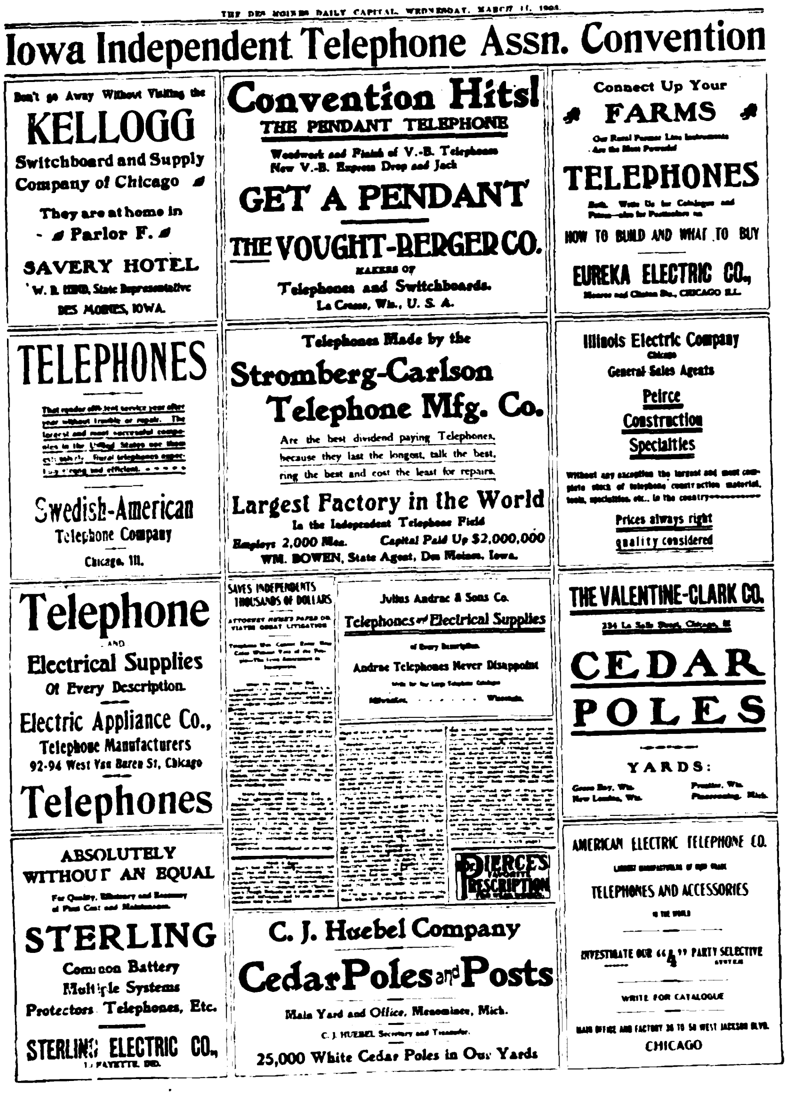
The afternoon session was opened with the election of officers. Dr. H. S. Herr, of Ottumwa, was elected president unanimously; J. C. Sullivan, of Creston, was unanimously made vice-president, and C. C. Deering, of Des Moines, was re-elected secretary unanimously. The executive committee was elected by ballot, seven nominations being submitted as follows: Messrs. G. N. Bandy, U. S. Alderman, Chas. Kirk, M. Presson, Dr. Waud, Mr. Bellamy, H. C. Raney and G. W. Wagner. Messrs. Bandy, Kirk, Alderman, Waud and Bellamy were declared elected.

Mr. Holdoegel moved a vote of thanks to the new president and Mr. Presson moved that Secretary C. C. Deering be paid $50 for his services of last year. Both motions prevailed. Papers by H. C. Raney, of Fairfield; W. H. Swainey, of Manning; G. A. Haynie, of Savannah, Mo., and Geo. A. Atkinson, of Creston, were not read, those gentlemen not being present.

The most prominent of the papers and the one which attracted the most attention was that read Wednesday afternoon by Attorney J. C. Hume, of the law firm of Kinne, Hume & Bradshaw, which recently acted as counsel for the plaintiff in the suit of Chamberlain vs. the Iowa (Bell) Telephone Company, the Supreme Court rendering a decision which resulted in the reversal of the lower court. It gave the Iowa Telephone Company the right to operate its telephone lines and to maintain its poles and wires on the highways and streets in the cities where lines had been prior to the amendment of the state law in October, 1897.

At the close of the paper a committee was chosen to prepare a resolution of thanks, it being declared by many of the members that they would be saved thousands of dollars and endless litigation by reason of the pointers they had received from the speech. The substance of this paper was as follows:

> We represented the plaintiff, Mr. Chamberlain, in the case, and the Supreme Court rendered its decision against us. Yet I feel pleasure in speaking to you of it. It makes me think of our old professor, Dr. Lillee, who took delight in speaking to us of an especially technical operation he had performed. With great glee he told us of having cut open the patient and taking out the interior organs. In ecstasy he went on to tell of the details of the examination and the delicacy with which it was performed. One of the students, who was aware of the result of the operation, said to the doctor: "But how about the patient, did he live?"
>
> "Oh, no; he died, but he died cured. It was a beautiful operation—beautiful," the doctor replied. It is that way with us. We died, but it was a beautiful operation.
>
> The decision of the Supreme Court was on the question as to whether the telephone companies had the right to operate their lines in the cities of Iowa. The holding was that they had.
>
> In order to get at the entire situation you will have to go away back. Before the United States was organized the Continental Congress passed a law establishing the post roads. These roads were mail roads, and after the adoption of the Constitution they were continued, gradually spreading throughout the settled districts. In 1840 the Morse telegraph was invented, a line was started from Baltimore to Philadelphia over one of these post roads, and it was built in 1844. In '58 we had the first transatlantic cable and in '61 the first transcontinental railway line. All of these things caused the question of right of way to first arise. In 1866 the post road act was passed, giving the telegraph companies, which had spread rapidly, the right to erect lines over all post or mail roads free. In 1872 another law was passed through Congress which gave the railroads the same right. The streets of all cities were at that time thrown open as well as of States to the telegraph and the railroad. In 1876 Bell patented the telephone and almost immediately telephone lines sprang up all over the country. The Bell Company bought all of the new patents, and with its old ones, managed by means of suits and injunctions to keep the Independent companies out of the field for seventeen years. All this time it was establishing its lines over the country, having waxed fat on its profits until it had a cobweb of lines over the United States. Then the telephone companies took advantage of the telegraph law, it being claimed that the telegraph was a part of the telephone and that the two were virtually the same.


THE DES MOINES DAILY CAPITAL, WEDNESDAY, MARCH 11, 1903.

Iowa Independent Telephone Assn. Convention

Don't go Away Without Visiting the
KELLOGG
Switchboard and Supply Company of Chicago
They are at home in
Parlor F.
SAVERY HOTEL
W. B. HIND, State Representative
DES MOINES, IOWA.

Convention Hits!
THE PENDANT TELEPHONE
Woodwork and Finish of V.-B. Telephones
New V.-B. Express Drop and Jack
GET A PENDANT
THE VOUGHT-BERGER CO.
MAKERS OF
Telephones and Switchboards.
La Crosse, Wis., U. S. A.

Connect Up Your
FARMS
Our Rural Farmer Line Instruments Are the Most Powerful
TELEPHONES
Both. Write Us for Catalogue and Prices—also for Postoffice on
HOW TO BUILD AND WHAT TO BUY
EUREKA ELECTRIC CO.,
Monroe and Clinton Sts., CHICAGO ILL.

TELEPHONES
That render efficient service year after year without trouble or repair. The largest and most successful companies in the United States use them exclusively. Rural telephones especially strong and efficient.
Swedish-American Telephone Company
Chicago, Ill.

Telephones Made by the
Stromberg-Carlson Telephone Mfg. Co.
Are the best dividend paying Telephones, because they last the longest, talk the best, ring the best and cost the least for repairs.
Largest Factory in the World
In the Independent Telephone Field
Employs 2,000 Men. Capital Paid Up $2,000,000
WM. BOWEN, State Agent, Des Moines, Iowa.

Illinois Electric Company
Chicago
General Sales Agents
Peirce Construction Specialties
Without any exception the largest and most complete stock of telephone construction material, tools, specialties, etc., in the country
Prices always right
quality considered

Telephone
AND
Electrical Supplies
Of Every Description.
Electric Appliance Co.,
Telephone Manufacturers
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Telephones

SAVES INDEPENDENTS THOUSANDS OF DOLLARS
ATTORNEY HUME'S PAPER OBVIATES GREAT LITIGATION

Julius Andrae & Sons Co.
Telephones and Electrical Supplies
of Every Description.
Andrae Telephones Never Disappoint
Write for Our Large Telephone Catalogue
Milwaukee, ... Wisconsin.

Pierce's Favorite Prescription

THE VALENTINE-CLARK CO.
334 La Salle Street, Chicago, Ill.
CEDAR POLES
YARDS:
Green Bay, Wis. Prentice, Wis.
New London, Wis. Pinconning, Mich.

ABSOLUTELY WITHOUT AN EQUAL
For Quality, Efficiency and Economy of First Cost and Maintenance.
STERLING
Common Battery
Multiple Systems
Protectors Telephones, Etc.
STERLING ELECTRIC CO.,
LA FAYETTE, IND.

C. J. Huebel Company
Cedar Poles and Posts
Main Yard and Office, Menominee, Mich.
C. J. HUEBEL Secretary and Treasurer.
25,000 White Cedar Poles in Our Yards

AMERICAN ELECTRIC TELEPHONE CO.
LARGEST MANUFACTURERS OF HIGH GRADE
TELEPHONES AND ACCESSORIES
IN THE WORLD
INVESTIGATE OUR "4" PARTY SELECTIVE SYSTEM
WRITE FOR CATALOGUE
MAIN OFFICE AND FACTORY 36 TO 50 WEST JACKSON BLVD.
CHICAGO

A PAGE FROM THE DES MOINES *DAILY CAPITAL*, DURING THE CONVENTION.

> In 1851 Iowa's code was adopted, which gave the telegraph companies the right to operate their lines over the highways of the States and cities. Up to 1882 this remained unchanged.
>
> The Bell Company came in with telephones in 1879, and it was soon built over a great part of the State. At that time the telegraph law was attached to the telephone by analogy. In 1882 the Bell Company very craftily had the Iowa Legislature amend its telegraph law by inserting after telegraph the words "or telephone," giving the telephone company vested rights in the highways as well as the telegraph people. These vested rights were protected by the Constitution of the United States as well as the Constitution of Iowa, and can never be changed.
>
> In 1897 the legislature passed a new law relating only to the companies that wished to enter the streets of the cities after that time. This law said that the companies could only secure the right to enter a city's streets by a referendum vote of the whole people. All those companies, then, that were in the cities and on its mail streets, where mail is carried or deliverd, can stay there forever if they wish. The Bell companies have their right of way granted forever in these places. We cannot fight them by attacking the law. We will have to fight by competition. Plants seeking to be established in the cities now can only obtain the right through the votes of the people.

The paper provoked much discussion. Dr. Waud, of Germania, asked if the council's voting a franchise authorized a company to enter a city. Mr. Hume said it would permit the companies entering but not authorize them to do so. Mr. Holdoegel, of Perry, asked if the company had a right to establish an exchange if it operated a toll line in a city. Mr Hume said that the exchange could only be established over the streets on which the toll line operated. Mr. Bandy, of Des Moines, wanted to know if the constitutionality of the law might be safely attacked. He was told that it might be attacked but hardly successfully. Mr. Hume thought it would hold in any court.

H. C. Raney, of Fairfield, was to have read a paper, "The Advisability of Charging Subscribers for Wiring their Houses for Telephone Service," but he was unavoidably absent.

President Alderman then called Mr. J. S. Bellamy, of Knoxville, to the chair while he presented a set of arbitration rules, which are as follows:

ARBITRATION RULES IOWA STATE TELEPHONE ASSOCIATION.

First—The president shall appoint, subject to approval by the Executive Committee, a committee of three on arbitration, whose duties shall be to hear and decide cases of disagreement submitted to them, if within the jurisdiction of the committee as hereinafter defined and in which the question of dispute refers to the telephone business or matters pertaining thereto, and does not involve any question of the policy of this association.

Second—Such committee shall have authority to hear and decide all questions referred to it properly under its jurisdiction, and its decision when made shall be final, except the right of appeal to this association when next in convention assembled.

Third—Any member of this association who shall feel aggrieved by the act of another member or by the act of a person outside of the association, or any person not a member of this association who shall feel aggrieved by the act of a member and desires the case to be arbitrated by the committee, may state his grievances in substance in writing to the secretary with his request for arbitration of it, also stating whether or not there is pending any action in court on the questions to be submitted.

Fourth—When the secretary receives the statement in writing of such grievance and he considers it a proper case to refer to the committee on arbitration and no action has been begun thereon in court, he shall within ten days notify the opposite party to the case, who shall within ten days thereafter advise the secretary in writing whether or not he is willing to submit the case to the committee on arbitration for its decision, and if in the affirmative he shall at the same time furnish the secretary in writing a statement of the facts in the case so far as he knows them. The secretary shall then notify the applicant of said acceptance, who shall within three days thereafter furnish the secretary in writing with the material facts in the case so far as he knows them. Each party to the case shall verify under oath all evidence he submits in writing, and each party to the case before it is submitted to the committee shall agree in writing to submit the case to the committee on arbitration; that no action is pending thereon in court; that he will abide by its decision except only the right of appeal to the association while in convention assembled; that he will release all members of the committee from any responsibility for errors in judgment in any respect whatsoever, or for any damage or any loss suffered by reason of their acts, and will further deposit with the secretary the sum of five dollars ($5) if a member, and ten dollars ($10) if not a member of the association, said money so deposited to be used to cover the expense of the arbitration. It being understood, however, that the party in the wrong, as so found by said arbitration committee, shall pay all of the expenses of arbitration, and said committee shall have the full power and right to assess the costs of arbitration to either one or to both parties as they in their judgment may see fit. Said committee may, if they see fit, refund the money paid for purpose of arbitration to any party who has so paid in money. Any case on which an action in court is pending shall not be submitted to the committee on arbitration.

Fifth—When all of the requirements of Section 4 have been complied with, the secretary shall refer the matter to the committee on arbitration for their decision. Said committee shall at their first meeting thereafter decide the case and render their findings in writing to the secretary, who shall at once notify the interested parties of such decision. It shall be the duty of the committee to tax the costs in each case in such proportion as they deem just and equitable, and their report of the case in writing to the secretary shall include a statement of the amount of costs each party is to pay. The parties to the case shall comply with the decision of the committee within thirty days after receiving notice of it from the secretary unless an appeal is taken to the association in convention assembled, and the decision of the association as rendered on such appeal must be complied with not later than ten days after decision rendered and notice thereof.

Sixth—It shall be the duty of the committee on arbitration to hear and determine all cases submitted to it by the secretary within its jurisdiction and to render a just and equitable verdict thereon according to the evidence and to the best of their ability. The committee shall have jurisdiction in cases arising in territory covered by this organization between members thereof, between its members and a non-member, by consent of the member. The members of the committee are not to be held responsible for errors of judgment in any respect whatever nor for any damage done nor any loss suffered by reason of their acts.

Seventh—The members of this committee before entering upon the duties thereof shall each subscribe to the following oath or affirmation: "I do solemnly swear (or affirm) that I will faithfully and fairly hear and examine all matters in controversy that may be submitted to this committee, and that I will make a just and equitable award or finding upon the same according to the evidence and to the best of my understanding. So help me God."

Eighth—If the parties to a case submitted for arbitration desire to present the matter to the committee in person or by attorney, they may do so by paying whatever amount in addition to the amount provided in Section 4, to be paid as shall be necessary to cover the additional expense of the committee, if any, of such personal hearing. The amount of the additional costs to be determined by the committee. All evidence submitted to the committee in person shall be given under oath when so required by the committee. Only members in good standing of this association or of a kindred association of this State may act as an attorney before the committee.

Ninth—When a case is referred to the committee on arbitration they shall fix a time for its hearing and notify the secretary of the date so fixed, which date so fixed shall be a sufficient time in advance to permit the secretary to give the interested parties and their attorneys five days' notice of the date and place of trial. The parties shall present all written evidence to the secretary on or before the date fixed for hearing, and neither party shall postpone the hearing of a case longer than ten days after it has been submitted unless good cause can be shown therefor satisfactory to the committee.

Tenth—Notice herein provided to be given by the secretary shall be deemed completed service when such notice is mailed to the parties' last known address, but the notice of date fixed for hearing shall be by registered letter.

Eleventh—The members of the committee on arbitration shall receive for their services five dollars ($5) per day for the time used in considering and deciding the cases submitted to them, also the amount of their actual traveling expenses and hotel bills. * * * * *

HOLD-UP METHOD OF SAVERY HOTEL.

On motion, these rules were referred to a committee composed of B. J. Carney, Grinnell; T. J. Waud, Germania, and Mr. Bandy, of Des Moines. The committee recommended the rules and reported that they be adopted, which was done. They also offered a resolution that the Iowa Independent Telephone Association incorporate at the next session, so that the rules, for the settlement of disputes between the members, be more binding on the members. This will assist in making them live up to the arbitration agreement.

After transacting some comparatively unimportant routine business the convention adjourned. Considerable unfavorable comment was occasioned by the hold-up tactics of the Savery Hotel, where the convention was held, and where most of the manufacturers and delegates stopped. The Savery charged $20.00 a day for even one person in a room occupied by a manufacturer. It is safe to say, if the association holds another convention in Des Moines, the Savery Hotel will not be patronized.

OPERATORS PRESENT.

Among those present at the convention were the following: George N. Bandy, Des Moines; Musson Bros., Atlantic; W. B. Lunny, Audubon; C. R. Benedict, Shelby; H. A. Kinney, Woodbine; A. B. Smith, Woodbine; Charles A. Cockerill, Jefferson; Charles B. Kirk, Chariton; W. D. Boydston, Chariton; Johnston County Telephone Company, Iowa City; Olds Telephone Company, Olds; West Branch Telephone Company, West Branch; Johnson County Mutual Telephone Company, Iowa City; B. J. Conway, Mitchellville; J. St. Bellamy, Knoxville; J.W. Chambers, Britt; F. W. Kelly, Oskaloosa; W. D. Dunsmore, Oskaloosa; W. E. Byram, New Sharon; Fred Anthony, S. T. Rhode, Fremont County; C. W. Smith, Brighton; L. D. Robinson, Washington; W. A. Wilson, Washington; F. C. Cleaver, Otto C. Herman, Boone; D. M. Griswold, Hawkeye Telephone Company, Des Moines; George A. Atkinson, J. C. Sullivan, John Hackitt; Creston Mutual Telephone Company, Creston; F. H. Peterson, Dews; Vernon Farmers' Mutual Telephone Company, Dews; Clarion & North Western Telephone Company, Clarion; I. B. Stafford Telephone Company, Blansbury; H. W. Cutshall, Shelby Independent Telephone Company; West Branch Telephone Company, E. C. Ball; West Liberty Telephone Exchange, Albert Whitacre; Mitchellville Telephone Company, Mitchellville.

MANUFACTURERS AND SUPPLY MEN.

Over 35 manufacturers and supply dealers were represented at Des Moines and nearly every one made an exhibit of their goods. Among those present were the following:

Valentine-Clark Company, represented by Ernest L. Clark and F. L. McGillan.

The American Electric Telephone Company, represented by S. J. Bear and W. R. Hampton.

The Holtzer-Cabot Electric Company, represented by E. R. Harding.

Stromberg-Carlson Telephone Manufacturing Company, represented by Wm. Bowen, its state representative, and W. J. Rousseau.

Chicago Telephone Holder Company, represented by F. W. Pardee, general manager.

The Only Manufacturing Company, Moravia, Ia., represented by C. M. McFatridge.

John A. Roebling's Sons Company, represented by W. J. Crawford.

The Standard Underground Cable Company, represented by E. J. Pietzcker.

Watkins Telephone Device of San Jose, Cal., was represented by W. D. Watkins.

The Vought-Berger Company was represented by Mr. Berger.

C. J. Huebel Company, of Menominee, Mich., was represented by C. J. Huebel, secretary and treasurer of the company.

Swedish-American Telephone Company, represented by E. B. Overshiner.

Western Telephone Manufacturing Company, represented by James E. Keelyn.

The Eureka Electric Company, by D. J. Kusel.

Chicago Telephone Supply Company, by Mr. Du Vall.

Williams-Abbott Electric Company was represented by its president, Louis Sands.

American Electric Fuse Company by Frank Jones and J. A. Kenney.

The Illinois Electric Company was represented by Malcomb McNull, N. G. Harvey and V. C. Littleton.

Ericsson Telephone Company was represented by J. H. Montague.

Sterling Electric Company was represented by its sales manager, F. E. Rotchka.

The Monarch Telephone Manufacturing Company was represented by P. J. Hertz.

The Illinois Electric Specialty Company by F. B. Patten.

The Macomber and Whyte Rope Company was represented by its president, George Whyte.

The McDermid Manufacturing Company was represented by C. L. Burlingham.

Julius Andrae & Sons Company, represented by Otto Brochert.

Chicago Telephone Supply Company, represented by Stanley Du Vall.

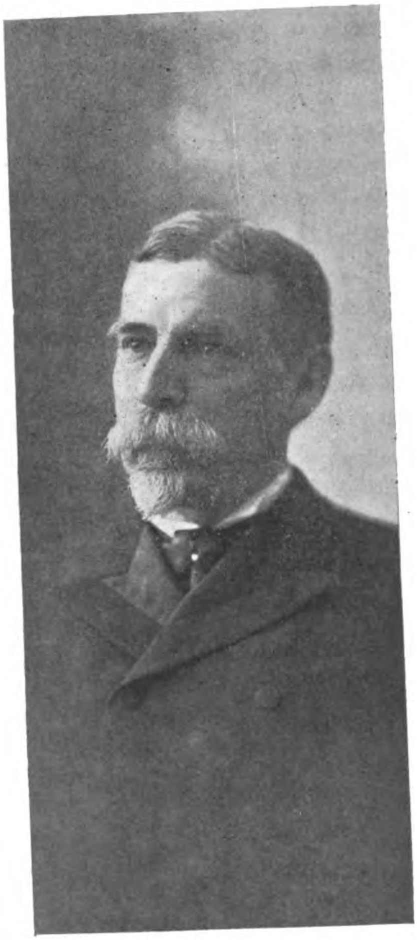
George W. Conover, Chicago, Ill.

Kellogg Switchboard & Supply Company, represented by W. R. Hind, its state representative, and R. S. Mueller.

The Electrical Appliance Company was represented by S. A. Dinsmore and H. E. Mason, its Iowa representative.

INDEPENDENT TELEPHONE ASSOCIATION OF MAINE HOLDS A CONVENTION

THE Independent Telephone Association of Maine held a meeting at West Paris on March 9th. This Association was formed in 1901 and is an alliance of nearly all the Independent companies operating in Maine and includes the Northeastern Telephone Company, of Portland, The Iron Tree Telephone Company, The Curtis Hill and West Paris Telephone Company, Bryant's Pond and Paris Telephone Company, Greenwood and Woodstock Telephone Company, Citizens Telephone Company of South Paris, Norway Local Telephone Company, Paris and Sumner Telephone Company, East Milton Telephone Company and the Greenwood Local Telephone Company. The principal business of the convention was a discussion of ways and means with which to fight the Bell telephone company in Maine and particularly to secure the repeal of several legislative acts tending to a continuance of the Bell monopoly.



LEWIS A. GOUDY,
President.

When this association was organized in October, 1901, M. S. Bird, of the Eastern Telephone Company of Rockland was elected president. The basis of this formation was the intercommunicating contracts that had been made by the Eastern Company with many of the rural and village exchange lines. A short time after the organization of this association, however, the Eastern Company merged its interest with the New England Telephone & Telegraph Company, the American Bell licensee.

This action was greatly deplored by the Independents of Maine and nearby states and occasioned a great deal of bitter feeling on the part of the rural companies which had thus been duped into an alliance with the Bell. The latter demanded that they use Bell instruments, which the Independents emphatically refused to do. The Bell company then refused to continue the intercommunicating contracts, which, in addition to the increase of toll charges and advance of rates in certain points has created a decided agitation on the part of the public against the Maine licensees of the Bell company.

Some years ago the Bell company succeeded in having a law passed by the Maine Legislature whereby any other company in the state was debarred from entering into competition with or paralleling the lines of the Bell company. This legislation, however, has been wiped out through the aggressive action of the Independent companies supported by the Maine State Grange, which desires rural telephone connections, and also by the Bell company, which was forced to join in the repeal of this law.

Immediately in connection with this action, however, a move was made by the Bell company for other legislation whereby it or its allies or representatives could force suspension of construction of lines by appeal to the Supreme Court from the decisions of municipal officers of towns and cities granting rights to Independent companies, which would cause long delays and discouraging results. It was in this proposed legislation that the recent meeting of the Maine Independents was particularly interested.

Mr. Bird, who has remained president of the Association since its organization, although he is now affiliated with the Bell company, was retired as president, being superseded by Lewis A. Goudy, vice-president and general manager of the Northeastern Telephone Company. The other officers elected are R. L. Cummings, Citizens' Telephone Company of South Paris, first vice-president; P. C. Chandler, Pine Tree Telephone Company, New Gloucester, second vice-president; E. L. Durgan, Northeastern Telephone Company, Portland, secretary; F. L. Wyman, West Paris & Curtis Hill Telephone Company, West Paris, treasurer. The executive committee consists of B. G. McIntire, Waterford; John H. True, New Gloucester; Dr. F. H. Packard, West Paris; E. W. Gross, Auburn; E. L. Tibbetts, Lewiston; George H. Jones, Oxford, and H. C. Cook, Casco.

A unanimous vote of thanks was extended to President Goudy for his explanation of the Independent Telephone situation in Maine and New England and he was authorized and requested to represent all Independent telephone companies who are members of the association.

ELECTRICAL MEASUREMENTS—ARTICLE VIII—LOW READING VOLTMETERS AND AMMETERS

By Arthur Vaughan Abbott.

BEFORE proceeding further with the various tests which may be made with the voltmeter, it is desirable to study more in detail its construction in order to comprehend how a sufficiently wide range of instruments to perform all tests can be secured. On page 158 of The American Telephone Journal Fig. 1 shows the general appearance of the Weston instruments of all types. If the brass case be removed, the magnetic system will be seen to consist of a powerful U-shaped magnet (Fig. 1 in this article), carrying the pole pieces, *P P*, which are bored out with great care, forming a hole about 1¼ inches in diameter. In the centre of this is placed a piece of soft iron, *C*, carefully turned to leave a space of .04 inches between the poles in which the movable coil must swing. Fig. 2 shows the coil and pointer. The frame of the coil is of solid drawn aluminum, on which very fine wire is wound, the whole being only .015 inch thick. The coil is supported in sapphire bearings and supplied with light spiral springs

Editor's Note.—The first article in this series appeared in the issue of January 17. They will continue for over a year.

made of non-magnetic metal, serving to keep the needle under a constant and uniform tension.

As it would be impracticable to place sufficient wire to secure the necessary resistance on the moving coil, a supplementary coil is placed in the case of the instrument. When the voltmeter is a double scale instrument, this coil is divided into two parts, the whole coil being placed in circuit for high voltages, and only a portion for low ones in a manner analogous to that described in the last paper for extending the capacity of a voltmeter by adding resistance to it. Fig. 3 shows a skeleton view of a double coil instrument, the dotted lines showing the connection to the terminals, the coil in the base, and the moving coil.

Consider now the action of the voltmeter in the light of Ohms' law. Assume an instrument of 1,000 ohms in the moving coil and 9,000 in the stationary one, total 10,000 ohms. Suppose this be connected to ten cells of storage battery, giving a known electromotive force of 20 volts. The resistance of the wires from the voltmeter and the battery is so small in comparison with the 10,000 ohms of the instrument that they may be neglected, and taking Ohms' formula we have $E = 20$ volts, $R = 10{,}000$ ohms, $C = \frac{20}{10{,}000} = .002$ amperes. This is the current which passes through the voltmeter. The needle will deflect say about an inch, and as the battery gives 20 volts, we mark the point on the scale under the needle 20. If now we double the battery to 40 volts, .004 ampere will flow, the needle will deflect two inches and the scale at this new point must be marked 40. If the battery be halved to ten volts .001 amperes will flow, the needle will deflect half an inch and the scale be marked 10. Thus we see that where the voltmeter has a very high resistance compared to the source of electricity, the current which passes through it is exactly proportional to the voltage, and as the deflections of the needle are proportional to the current they are equally proportional to the voltage. It would be just as easy to mark the point were the needle stands with ten cells, .002 amperes, or to mark it 20 volts. So that an instrument can be made, by properly graduating its scale, to read either a large number of volts or a small number of amperes. Suppose the 10,000 ohm instrument to be connected to an unknown source and the needle deflects 3 inches, we know by experiment that 1 inch on the scale means 20 or .002 volts, hence 3 inches means 60 volts or .006 amperes. If, therefore, we know the resistance of any voltmeter and how much the needle moves for either a given number of volts, or a given number of amperes, we can use it to measure either amperes or volts as we please.

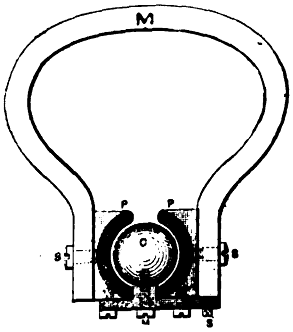


FIG. 1.

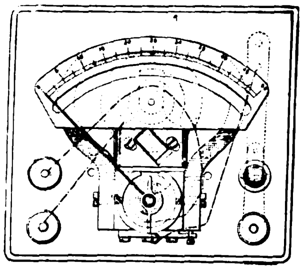


FIG. 3.

So far the voltmeter has been assumed of constant resistance, but there is a supplementary coil which may be cut out at pleasure, and when removed the resistance is reduced from 10,000 ohms to 1,000. If now it be connected to the 20-volt battery the current will be $\frac{20}{1{,}000} = .02$ amperes, or ten times what flowed in the previous case. Hence the needle will be deflected (if possible) over ten inches instead of one inch, and each scale division will have ten times the former value. With the supplemental coil in circuit, one volt or .0001 ampere was represented by one-twentieth of an inch, without the coil. One volt, .001 ampere, gives a deflection of one-half an inch. From these examples we deduce the following rules.

First—The readings are proportional to the current which traverses the coil.

Second—Any instrument may be graduated to read either in volts or in amperes, or both.

Third—Instruments of large resistance will measure high voltages and very small currents, those of low resistance measure low voltages and large currents. Hence high resistance instruments are voltmeters and milliammeters and low resistance instruments are ammeters and millivoltmeters.

It is easy to see that these principles can be almost indefinitely extended. Instead of winding the movable coil to a thousand ohms it may be wound to five hundred, one hundred, or even a fraction of an ohm. With each reduction in resistance, a larger current will flow with a given electrical pressure, or if the voltage is reduced there will still be sufficient current to give readable deflections. The best method of reducing resistance is to wind the instrument with heavy, coarse wire which will carry heavy currents without danger, and hence a voltmeter is transformed to an ammeter or current measurer by reducing the resistance of its coils and changing the figures on the scale.

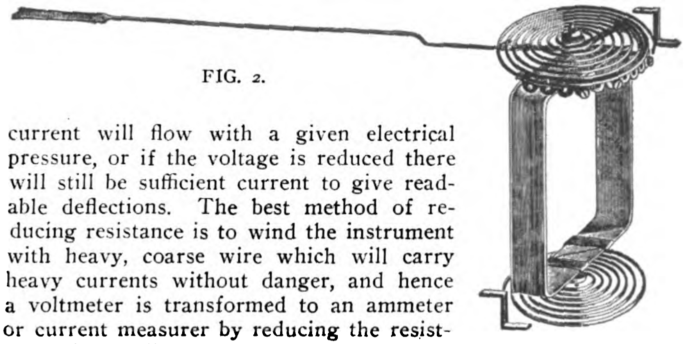


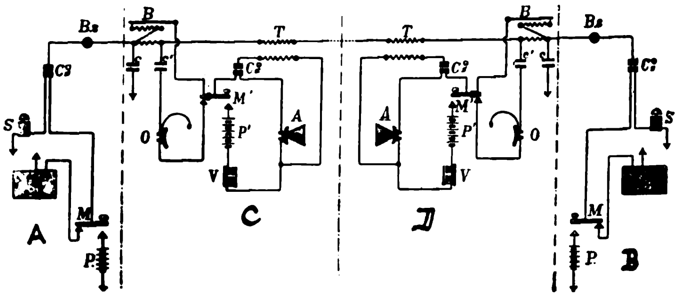
FIG. 2.

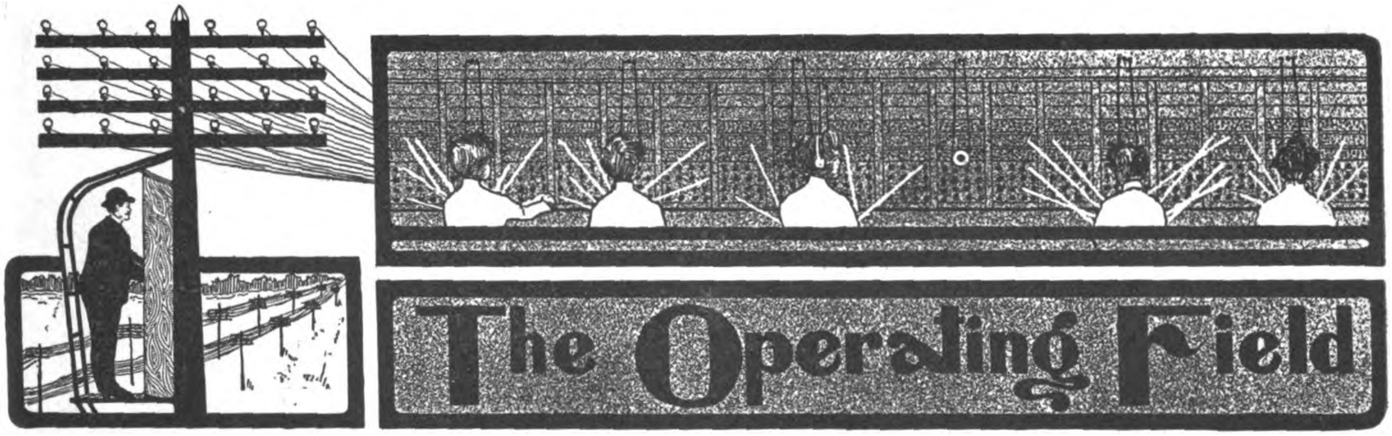
To test the condition of dry cells, the charge in a storage battery, or a cable for possible exposure to electrolysis, a low reading instrument is necessary. Such instruments are termed millivolt meters or milliammeters as the case may be, from the metric system prefix milli, meaning one thousandth. Thus the electrical engineer can measure either the electrical pressure of any source of electricity or the amount of current that is traversing any circuit. Equipped with a voltmeter and an ammeter he can measure both if he pleases, and knowing the current and the electromotive force he can always calculate the resistance.

THE TELEPHONE AS A RECEIVER IN MULTIPLEX TELEGRAPHY

A French inventor describes an ingenious arrangement for duplexing a telegraph wire, in which the telephone plays the part of a receiver. The system has received the test of experience having been in successful service between Tours and Chinon and Tours and Loches for the past six months.

There are four stations, *A*, *B*, *C* and *D*, which are united by a single wire and use a grounded return. At the stations *A* and *B* a regular Morse key and sounder are used, and messages to *A* and *B* are transmitted in the ordinary manner. At each of the stations *C* and *D* a telephone transmitter and receiver are located, which are not placed in the line, but are electrically connected thereto by means of the induction coils *B* and *T*. Between each of the telegraph and telephone stations a retardation coil *Bs* is placed. In each local circuit of the telephones at *C* and *D*, a buzzer *V* is located in circuit with the battery *P'* and the key *M'*. When the key *M'* is depressed the buzzer operates and a series of short impulses are sent through the induction coil *T*. The retardation coils *B* and *S* prevent the induced impulses of the buzzer from reaching the Morse instruments, and the circuit between *C* and *D* is completed to ground by means of the condensers *C*. Therefore station *C* or *D* can send buzzer impulses over the line wire to each other. By means of the keys *M'* the buzzers at either station can be made to send Morse signals, which can be heard in the telephone as a receiver at the other station. By this contrivance stations *A* and *B* can communicate with each other in the regular telegraph fashion, at the same time that *C* and *D* are talking with each other by means of the buzzers with Morse code.





GREAT PROGRESS IN IOWA.

MANAGERS of Independent telephone companies who attended the recent convention of the Iowa Independent Telephone Association, estimated that there would be spent over two millions of dollars in 1903 on new toll lines and the establishing of more exchanges.

Of this, four hundred thousand dollars will be spent alone on two metallic copper circuit toll lines to run from Des Moines to St. Joseph, Mo. Two great Independent trunk toll lines will be built this summer connecting at St. Joseph with other Independent tolls that run into Kansas City and St. Louis.

O. M. DeLay of St. Joseph, manager of the Savannah Telephone Company, came to the convention for the express purpose of interesting local telephone men in his project. Mr. DeLay conferred with the management of the Southern Iowa Telephone Company, which now has a line south to Osceola, and the two companies contemplate putting two hundred thousand dollars into a trunk toll line this spring. The Savannah Company will build from Savannah to Chariton, Ia., a distance of seventy-five miles, this spring. It has already built its line from St. Joseph to Savannah and all of it is metallic circuit. The Southern Iowa Company will build from Osceola to Lamoni this spring, thence from Creston to Bedford, Mt. Ayr and Albany, Mo. This is a distance of seventy-five miles. The line will be part copper.

The second line is planned by a number of companies which will enter Des Moines by another direction, tapping a different territory between Des Moines and St. Joseph. W. R. Ellinwood, manager of the Leon Telephone Company, in Decatur County, is making arrangements to build a metallic line north across the county to connect with the Lamoni County Company and another series of small companies, until they shall form a chain line straight to St. Joseph.

HAS HAD A BIG SUCCESS.

ONE of the most successful of the newer Independent telephone companies is the Westerly Automatic Telephone Company, of Westerly, R. I. This company was organized a little over a year ago and commenced business in October of last year. When it was organized it was freely predicted that the company could not possibly succeed in securing more than 75 subscribers. The Bell company at that time had about 75 subscribers in Westerly and every one thought it had a complete monopoly of the field.

But the Westerly Automatic Company has been successful from the first day the exchange opened for service, when it had 70 subscribers connected and 30 more names on its list. As soon as the Automatic began operations, the Providence (Bell) Telephone Company made a reduction of 25 per cent. on all rentals and began a vigorous campaign for subscribers. It increased its list through these efforts to 110 subscribers, with rates ranging from $18.00 upwards. The Automatic Company's rates are $20.00 for residences and $30.00 for business telephones.

The Automatic Company now has 180 subscribers connected with about 200 names on the list and additional ones constantly coming in. The entire capital stock of the company ($25,000) was underwritten at the start, but the business has grown so rapidly away from the original expectations that the company has petitioned the legislature for the right to increase its capital stock to $100,000.

In addition to its pole lines throughout the town of Westerly, all equipped with ample cable capacity and strictly first-class construction, the company has over five miles of line to Watch Hill, six miles distant, where connections will be made to Narragansett Pier and Peacedale.

The company has asked for franchises to build a line through Potter Hill, Ashaway, Niantic, Wood River Junction and Carolina to Kenyon, 17 miles distant. This is a very prosperous territory now entirely without telephone service. By next summer, when the Watch Hill sub-exchange and the country toll lines are in operation, the Westerly Company expects to have at least 300 subscribers on its exchange list.

TOLEDO HOME COMPANY MEETING.

AT a recent meeting of the stockholders of the Toledo, Ohio, Home Telephone Company, the old directors, with a single exception, were re-elected. The directors organized by electing these officers: President, Ed. L. Barber; vice-president, M. V. Barbour; treasurer, James S. Brailey, Jr.; secretary and general manager, Robert E. Hamblin.

General C. M. Spitzer retired from the directory and Clarence Brown was elected to fill the vacancy. The other members of the board are: Ed. L. Barber, James S. Brailey, Jr., Marcus V. Barbour, Minot I. Wilcox, Jay K. Secor, Thomas H. Tracy, James J. Robison, Daniel C. Shaw, Arthur B. Taylor and Robert E. Hamblin.

General Manager Hamblin presented a report to the stockholders that contained some interesting data. Since February 1 Mr. Hamblin caused an accurate record to be made of the number of calls received at the Home exchange. The record shows that close to a hundred thousand calls kept the 144 operators busy during every 24-hour period. The exact number of calls received in any one period of 24 hours averages 97,969. Of this number 87,943 were received at the main exchange and the remainder at the East Side station. The total number of telephones in use is 6,485 and the demand for service is increasing every day.

Mr. Hamblin says the meeting did not discuss anything pertaining to an advance in rates.

FINANCIAL ASPECT OF FEDERAL PROPERTIES.

THE new management of the Federal Telephone Company, of Cleveland, Ohio., is rapidly putting the company's financial affairs on a sound business basis, and straightening out its affairs. The various subsidiary companies are now being financed. The Federal Company owns the bonds and most of the stock of these subsidiary companies and the subsidiary companies owe the Federal a great deal of money. This indebtedness is being cleared up by giving the Federal new securities. Preferred stock is being issued by some of the companies to pay off their indebtedness and to provide for new money. In this way the companies are already being put in fine shape.

It is expected to finance the Cuyahoga Telephone Company, of Cleveland, in the same way by the sale of $2,000,000 of preferred stock at 60. This proposition, however, will not be taken up immediately. The Federal will subscribe for its pro rata share of preferred stock, paying for most of it by the liquidation of the debt which the Cuyahoga owes the Federal.

It is expected that within a few weeks a sale will be made of the United States Telephone bonds, of which there are outstanding $1,865,000 and which are owned by the various members of the Everett-Moore syndicate and by the Federal Telephone Company. With these United States Company bonds sold and the money owed to the Federal by the various subsidiary companies paid in first class securities, there is every reason to believe that it will be easy to float an issue of collateral bonds which will allow the Federal to pay its floating indebtedness. It will be seen that the financing scheme as it is being worked out provides that the subsidiary companies raise the necessary new money to improve the telephone plants themselves, the Federal taking its pro rata share of new securities. Therefore, if the floating debt is taken care of, the Federal will be out of difficulty and in fair shape to make a showing on Federal common.

President Dickson is inaugurating a great many economies in the Federal Company and all the subsidiary companies. This week the purchasing department of the Federal which has been conducted by C. W. Wason, has been discontinued and the purchasing of supplies will be done by Manager Turner for the Cuyahoga Company, Manager Robinson for the United States company and O. F. French for the other Federal subsidiary companies.

CHICAGO BRANCH A. I. E. E. TELEPHONE MEETING.

THE Chicago branch of the American Institute of Electrical Engineers will hold a meeting on May 19th devoted to the telephone. No meeting was held in Chicago in February, and the telephone meeting was therefore postponed until the last of the season. It bids fair to be the most important telephone meeting, from an engineering standpoint, of the year.

Among the members of the Chicago branch are some of the best men in the Independent telephone field, and also some of the best Bell men. The scope of the Chicago meeting will therefore be very much larger than was the meeting held in February in New York, at which only Bell practices were discussed.

Kempster B. Miller, of the local executive committee, is arranging for a discussion by the leading Independent telephone engineers and Angus S. Hibbard, of the same committee, is looking after the Bell interests.

It is not the intention to make this meeting a conflict between the Independent and Bell sides, but to bring out the various methods of treating telephone engineering problems by both Bell and Independent companies.

COMPETITION IN ASHLAND, WISCONSIN.

THE Home Telephone Company, during the past few days has rapidly forged ahead, says the Ashland, Wis., *News*. In a very short time the new company will have a majority of the telephones in the city and will eventually force its elder rival from Ashland.

At a recent meeting held by the Lake Superior Retail Butchers' Association in Ashland it was decided to do away entirely with the Wisconsin Company's instruments and service and to exclusively use the new system. It is said that any butcher receiving orders over the old telephone is liable to a fine.

All of the old telephones have been ordered out of the county and city offices, and calls from the new telephones are the only ones that are receiving consideration.

The Home company is placing from ten to twenty-five new telephones a day and is making very rapid headway.

CLEVELAND'S MAYOR WARS ON BELL.

MAYOR JOHNSON, of Cleveland, Ohio, has given orders for a vigorous fight on the Cleveland Telephone Company, if any grounds for sustaining the city in such a fight can be found.

Some months ago the Cuyahoga Telephone Company asked permission to set some poles, with the end in view of furnishing telephone communication with a school.

The Cleveland Company already has poles on the proposed route, and the Mayor requested the Cuyahoga Company to enter into negotiations with its competitor for an arrangement whereby both companies could use the same poles.

The Cuyahoga Company agreed to try to make such an arrangement, but reported that its efforts had been in vain, that no arrangement with the other company could be made.

Mayor Johnson requested Law Director Baker to begin an immediate investigation of the matter and find by what right the Cleveland Company had its poles up.

"If possible we'll make them take down as many poles as we can, and then see whether or not they are willing to make some arrangements whereby the city will be benefited to some extent," said the Mayor.

BRIGHT OUTLOOK FOR CUYAHOGA.

SINCE President Dickson, of the Cuyahoga Telephone Company, took hold of the affairs of the company, the operating expenses have been materially reduced.

During 1902 the expenses of operation were 54.55 per cent. of the earnings. For the month of January, 1903, they were 48 per cent. of the earnings, a reduction of 6.55 per cent. For the month of February they were even less than this. The exact figures, however, have not yet been announced.

Still further economy in operation is possible. The management now contemplates doing away with the use of one entire switchboard and using only three switchboards until the increased business necessitates the use of four boards. This will result in a great saving in operation.

For the month of February the net earnings will be considerable in excess of $16,000, or at the rate of $192,000 a year. As the fixed charges are $111,650, these figures would indicate that the property is making a showing of about $80,000 a year for the stock, or over 2½ per cent. on the outstanding issue.

A SUCCESSFUL NEW COMPANY.

THE OBLONG TELEPHONE COMPANY, of Oblong, Ill., was organized September, 1902. It now owns and operates forty miles of rural lines, connecting Eaton, Hardinsville and Pierceburg. Besides the local system in Oblong, the company has connected to its switchboard about forty farmers.

The company is making arrangements to construct a line to Robinson, the county seat of Crawford County. It has obtained a liberal franchise from the Robinson City Council, and will push the work this spring.

A new line from Robinson to Hutsonville is being constructed. It will connect with the line of the Wabash Valley Telephone Company, giving the Oblong company splendid long distance facilities.

Before the advent of the Oblong company, the Bell licensee there had a monopoly. It made a hard fight to keep the Independents out of Robinson, where it has about 200 telephones, but its past record was against it. The Oblong company experienced no difficulty in securing a franchise in Robinson. By the first of April fully one hundred farmers' homes will be connected with the Independent system.

E. T. Shire is secretary and general manager of the Oblong company. He has been one of the leading spirits in the new venture.

MINNESOTA INDEPENDENTS COMBINE.

THE proposed purchase of the Iron Range Telephone Company by the Zenith Telephone Company of Dublin, Minn., means eventually a network of Independent telephone lines running clear across northern Minnesota. The Iron Range Company now operates a system connecting Grand Rapids, Cass Lake, Bemidji and Crookston. The Zenith Telephone Company has thriving exchanges in Duluth and West Superior, and a toll line running out to Cloquet. By extending this from Cloquet to Grand Rapids the Zenith company would have a connected line from Duluth to Crookston, which would later be connected with Fargo and other points in the Red River Valley.

The Twin City Telephone Company, of Minneapolis, has a line connecting with the Zenith system, and the extension would mean an Independent telephone connection from Minneapolis to the Red River Valley.

Opinion and Comment

CANADIAN VIEW OF COMPETITION

SINCE the Bell monopoly was broken down, Independent telephone systems have been installed in fifty per cent. of the important cities of the United States.

Everywhere the Independents have met with a cordial reception. The telephone service under the stimulus of competition has been improved, so that it is hardly recognizable to-day as the same thing that was offered by the Bell—take it or leave it—seven or eight years ago. For this condition telephone subscribers have not been slow to express their appreciation. It has remained for some wise men from Canada to discover the whole scheme is wrong, that it was a grave mistake to permit interference with the Bell's exclusive control of the telephone field.

These wise men from Canada, being a "Telephone Committee" of the City Council of Hamilton, Ontario, "fully investigated" the matter of telephone competition some time ago. Their report, which reads almost like a Bell manifesto, has been assiduously spread by the people who have cause to believe, and perhaps hoped, that their existence depends in monopoly. Among other things the learned members of the committee, concluded: "It is not desirable for any community to have competition in telephones, unless it is to regulate some very grave evil. The almost universal experience has been that competition raises the rates materially to business and professional men, and lowers the rates somewhat to a resident."

It does not require very deep study to realize how absurd it is for a committee of city councillors to constitute themselves into a board of telephone experts. It stands to reason that the average city councillor, however respectable a business or professional man he may be, can have but the most superficial knowledge of the history of telephony, cannot even superficially understand the technicalities of the present condition of the business, and is utterly incapable of forming any intelligent judgment as to what the future of the business is likely to be, or should be. This last point is perhaps the most important of all; the past is gone and done with, the present is a matter of fact, open to the observation of any who choose to observe, but the future is before us and is what we have to plan and build for. Judging by the "conclusions" of the Hamilton Committee the only point of importance in the telephone situation is the matter of rates. This is an extremely narrow-minded view to take. While largely dependent, of course, on the rate question, the really vital principle in telephony is development—the bringing of the service into wide and general use. This aspect of telephony, which, in the minds of real telephone men, dwarfs every other, or perhaps it would be better to say is the focus of all others, is wholly ignored by the Hamilton Committee.

To lose sight of the most important side of a technical subject is exactly what one would expect of a committee of non-technical men. The committee apparently visited a number of places where telephone competition is in force, but which places they visited and from whom they derived the information on which the conclusions are based cannot be stated here as the full report is not published. The committee, however, cannot have been so far afield or so minutely have investigated telephone conditions as to justify the statement that "the almost universal experience has been that competition raises the rates materially to business and professional men, and lowers the rates somewhat to a resident." This is one of the most remarkable effects ever attributed to competition in telephony. The citation of "a resident" is almost as good a piece of singularity as the famous mule of Matanzas. One is curious to know, too, in view of this "almost universal" experience of the results of competition, some particulars of the favored corner of the universe where the effect has been different.

As Mr. Gest happily quotes, you do not go to an elm tree for pears, at least, not if you really want pears. A parochial committee is almost sure to evolve parochial views. "Competition in ordinary lines of business *may* be a good thing—." The italics are ours; the "may" is so delightful that it is a mystery that it should have escaped italics in the first place. It is a very widely held opinion that competition in "ordinary lines of business" *is* a good thing, but of course it all depends on the point of view. The fellow first established in any line, ordinary or otherwise, naturally thinks that competition is every kind of a bad thing, but the public and the enterprising competitor generally think quite differently. Each member of the committee was probably thinking of his own business when this qualified and cautious phrase was moulded into the "conclusions," and naturally consent was unanimous. The telephone business is extraordinary and needs different methods, but what the committee and those whom its report is intended to inform have quite failed to grasp, is that it is so extraordinary that a committee of non-experts is unlikely to be able to pass judgment on it effectively. Such a committee thoroughly understands neither what it sees nor what is told to it and its "conclusions" are as a rule not worth the paper they are written on. One expert investigation and report by an experienced and qualified man would be worth more as a guide than the labors of all the city councils of a continent.

AN AGREEMENT, INCLUDING A CONSTITUTION AND BY-LAWS FOR ORGANIZING A MICHIGAN CLEARING HOUSE*

By R. F. Johnson.

THIS AGREEMENT, entered into this ...... day of March, A. D., ... by the several parties hereto, WITNESSETH:

That whereas said parties are owners of telephone exchanges, toll lines and systems, which are neither connected with nor controlled by the American Bell Telephone Company, or any of its licensees or sub-companies, and desiring to operate the properties of said companies as one system by placing said several properties under a general head for the purpose of operation and auditing, joint business only, both as a means of economy and effectiveness, it is hereby agreed:

First—That the lines and systems of the several parties hereto shall be immediately so connected together that messages may be transmitted from the lines of the one to the lines of all the other parties to this agreement, thus forming one general system.

Second—That in consideration of the mutual advantages to be derived, said parties hereto do constitute and form the Michigan Traffic Association of Independent telephone companies, composed of the parties to this agreement, which shall be organized and conducted under the Constitution and By-laws hereto attached and made a part of this agreement, and under the Rules and Regulations and Schedules of Tariff Rates which may be adopted by the Traffic Committee of said Association, which said Rules and Regulations and said Schedules of Tariff Rates shall be a part of this agreement.

This agreement shall terminate at the expiration of .... years from the date of the organization of the Traffic Committee hereinafter provided for.

CONSTITUTION.

ARTICLE I.

Sec. 1. The name of the Association shall be "The Michigan Traffic Association of Independent Telephone Companies."

Sec. 2. The object of this Association shall be to promote and regulate interchanged telephone service between the different Independent telephone companies of the State of Michigan.

ARTICLE II.

MEMBERSHIP.

Any person, partnership or corporation, owning or operating telephone exchanges or toll lines in Michigan may become a member of this Association by signing the Traffic agreement, of which this Constitution and By-laws is a part, after making application to the Traffic Committee and receiving said committee's approval.

ARTICLE III.

MEETINGS.

An annual meeting of this Association shall be held on the .... day of .... in each year at such place as may be designated by the Traffic Committee, for the election of the Traffic Committee and for the transaction of such other business as may come before it. Special meetings of the Association may be called when deemed necessary by the Traffic Committee.

ARTICLE IV.

OFFICERS.

Sec. 1. The officers of this Association shall be a President, Vice-President, Secretary and Treasurer.

Sec. 2. The Traffic Committee herein provided for shall at each annual meeting of the Association elect from its number the officers of this Association, which officers shall be respectively ex-officio the officers of the said committee.

Sec. 3. The executive powers of this Association shall be vested in a committee, to be known and designated as the Traffic Committee, which committee shall be composed as follows: One member from each company signing this agreement, each member being entitled to one vote for each 100 miles, or major fraction thereof, of copper metallic toll line circuits owned and operated by it, and one vote for each 500 telephones or major fraction thereof owned and operated by it.

ARTICLE V.

DUTIES OF OFFICERS.

Sec. 1. The President shall preside at all meetings of the Association.

Sec. 2. The Vice-President shall, in the absence of the president, preside at all meetings of the Association.

Sec. 3. The Secretary shall collect all revenue of the Association and pay the same to the Treasurer, taking his receipt therefor. He shall keep all minutes and keep the proper records of all proceedings of the Association, and shall perform such other duties as usually devolve upon such officer, or that may be prescribed by the by-laws of this Association.

Sec. 4. The Treasurer shall have charge of the funds of the Association as paid to him by the Secretary, and shall pay them out only upon the voucher of the President and Secretary upon order of the Traffic Committee. He shall give a bond conditioned for the proper accounting of all moneys coming into his hands as such Treasurer, and a proper performance of all his official duties. Such bond shall be in such penal sum as the Traffic Committee may fix, and when executed shall be subject to said committee's approval.

Sec. 5. The Traffic Committtee shall have full charge of the affairs of the Association when such Association is not in session. They shall have the power, and it is hereby made the duty of this committee to make all the necessary rules and regulations relating to the handling, reporting, accounting and settling of all interchanged business, including the making out of all Association rate and mileage sheets, pursuant to and in conformity with such base rate as may be from time to time determined and agreed upon by this Association, and in all matters shall have such power and shall perform such duties and make such regulations as will secure the carrying into practical effect the general purposes of this Association, and of all such general rules, orders and provisions as may be enacted by this Association or the Traffic Committee pertaining to the toll line tariffs and service over the lines of this Association.

The said committee shall have power to provide and fix rate for toll line service for conversations of less than five minutes' limit, and to make and authorize such modifications or changes in toll rates in special cases as they in their judgment may deem expedient upon application therefor by at least two members of the Association. Said committees shall have power to make and fix the rates for all classes of special service not otherwise provided for.

The said committee shall have power to employ and fix the compensation of such persons in such capacities as the work of the committee and the interests of the Association may in its judgment require.

Sec. 6. The Traffic Committee shall meet from time to time at the call of the chairman, or upon the request of a majority of its members, at such central point as may be agreed upon by them.

ARTICLE VI.

REVENUES.

The revenues of the Association to be used for the purposes indicated shall be obtained by a pro rata assessment upon the gross toll line earnings and commissions to exchanges of the company becoming a member of this Association, or in any way becoming subject to assessment by this Association, and said assessment shall be made by the Traffic Committee from time to time as may in the judgment of such committee be found necessary. Such assessment may reach, but shall not exceed, ... per cent. of the gross toll line earnings and commissions to exchanges in one year of any member of this Association, or any other person or company subject to the assessment herein provided for.

ARTICLE VII.

In case of vacancies occurring among the members of the Traffic Committee, the company from which such vacancy exists shall fill the vacancy in such manner as it may elect for the unexpired term.

ARTICLE VIII.

Sec. 1. A majority of the members of the Association, duly represented, shall constitute a quorum for the transaction of business; provided, however, that it shall require a majority of all the members of the Association voting in the affirmative to adopt any motion, resolution or take any action, except to adjourn, and, provided, further, that the same person shall not be accredited as the representative in any way or for any purpose of more than one member of the Association at any regular or special meeting.

Sec. 2. A majority of the members of the Traffic Committee shall constitute a quorum for the transaction of business; provided, however, that it shall require a majority of all the members of said committee, voting in the affirmative, to adopt any motion or resolution, or take other action, except to adjourn.

ARTICLE IX.

AMENDMENTS.

This constitution shall be amended at any regular meeting by an affirmative vote of a majority of all the members of the Association, and at any special meeting of this Association, the object having been stated in the call, upon two-thirds vote of all the members present. The proposed amendment or amendments having first been signed by not less than two members and submitted to the Traffic Committee and filed with the Secretary at least thirty (30) days before said meeting, written notice of such proposed amendment or amendments having been mailed by the Secretary to each member of the Association at least twenty (20) days prior to any such meeting.

BY-LAWS RULES AND REGULATIONS.

1. These By-laws, Rules and Regulations, together with such printed or written orders and directions as may be issued and transmitted to the mem-

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*A paper read before the convention of the Michigan Telephone Association, February 26.

bers of the Association from time to time by the Traffic Committee, shall fix and determine the conditions under which all interchanged business shall be conducted between the exchanges and toll lines in this Association, and with such other exchanges and toll lines as the members hereof may now or hereafter have relations with for the interchange of toll line business.

2. Any company, firm or person, owning or operating any exchange or toll line, connecting with any exchange or toll line of this Association, and interchanging toll line business as provided for in these Rules and Regulations, may, upon application to the Traffic Committee and upon said committee's approval, be given a rating and granted a place in the tables, lists, schedules, etc., of this Association, and shall have the benefit of its cooperation, but subject to the same assessment as members of the Association, and all rules relating to the conduct of interchanged business.

3. The exchange or toll line company at whose exchange or toll line stations messages originate, shall have, in addition to its pro-rata mileage share of the toll: First, 25 per cent. of the toll charged without regard to the point at which said message shall be paid, and the remainder of such toll charge, after deducting such originating commission, shall be divided between the companies over whose lines such message passes in the proportion of the air line distances between junction points and points or origination and destination; provided, however, that in no case shall such originating commission exceed the sum of twelve and one-half (12½) cents; provided, however, that the terminal charges provided for in Section Ten (10) of these rules shall not be subject to the provisions of this rule.

4. Any exchange or toll line company accepting any message for transmission or delivery, and assuming the collections of charges for the same, shall account thereof at the proper settlement.

5. Each member of this Association, originating, transmitting or receiving any message or messages passing over the lines of two or more companies in any month shall check, report, account for and settle out the same in such manner and at such time and in such form as the Traffic Committee may prescribe.

6. The Traffic Committee shall prescribe all forms of blanks used in checking, reporting and settling of interchanged business.

7. All toll messages for general toll line day service shall be based upon a unit rate of .... per mile, land air line distance, for .... minutes service, and each toll charge under this rule shall be fixed at a sum equal to the nearest multiple of five. Any deviation from this rule shall be submitted to the Traffic Committee and be approved by them before taking effect.

8. All toll charges for general toll line service between the hours of 6 P. M. and 6 A. M. shall be as follows: In all cases where the day rate is not less than twenty-five cents nor over forty cents, the rate shall be twenty-five cents; and in all cases where the date rate is over forty cents, the rate shall be sixty per cent. of the day rate, estimating the same at the nearest multiple of five.

9. All messages or conversations occupying more time than that upon which the initial rate is based shall be charged for such overtime at the same proportion as the initial rate for each minute or fraction thereof.

10. All toll rates and mileage to and from points not mentioned in the rate sheets of the Association shall be the same as that fixed by the Traffic Committee for the exchange or station in the same county given in the Association rate sheet plus five cents terminal charge, which shall be paid to the terminal company.

11. All switching and junction stations other than at exchange points shall be established, equipped and maintained under the joint control and at the joint expense of the companies, or persons, whose lines are directly connected with such junction or switching station; and all messages terminating or originating at such points shall be held to be the exclusive business of the line over which such business is had.

12. Each exchange or toll line company must arrange for prompt messenger service in the notifying of persons for whom a call has been received and who are not provided with a telephone connected with the exchange or toll station.

13. In no case shall a messenger fee be charged where no messenger service has been actually rendered or where the person called has a telephone connected into the exchange to which the call came. In all other cases a minimum fee of 10 cents may be charged, and such sum shall be the maximum fee within the radius of one mile within any city or to any point in any town or village.

14. The Secretary of the Traffic Committee shall at each annual meeting of the Association make and submit a detailed report of the receipts and expenditures of the committee, showing each item of receipts and of expenditures, and accompanying the same with the proper bills, vouchers, etc., and he shall in addition thereto submit a written report of the doings and work of the committee for the year, supplementing the same with such statistical matter as will indicate the growth, condition and extent of the Independent toll line business, interests and property within the territory of the Association.

15. The Treasurer shall at each annual meeting of the Association render a report showing in detail and by items, accompanying the same with the proper vouchers, the receipts and disbursements of the revenues of the Association.

16. The Association shall at each annual meeting appoint a committee of not less than three to audit and examine the financial reports of the Secretary and Treasurer, such committee to be composed of persons not members of the Traffic Committee.

17. All toll tickets or coupons issued and furnished to patrons by any member of this Association shall be accepted in payment of toll charges at any exchange or toll station on the lines operated by the Association, and such coupons shall be redeemed at their face value whenever presented by any member of this Association that has accepted the same in payment for toll line service.

18. All toll tickets or coupons shall be bound in books of such denominations as will meet the requirements of patrons, and each of such books shall have attached thereto or printed thereon a statement of the conditions under which the same is sold, and shall be furnished to patrons at the following rates of discount: In quantities of $5.00, 5 per cent.; in quantities of $10.00, 7½ per cent.; in quantities of $25.00, 10 per cent; in quantities of $50.00, 15 per cent.

19. In the original construction or renewal of any toll line for through business, or in stringing of additional circuits on existing lines for that purpose, such standards of construction and material and appliances shall be complied with as may from time to time be prescribed by this Association; and all transmitting, signalling and switching instruments, apparatus and devices used in connection with and as a part of any toll line equipment, shall also conform to such standards of the Association as may be prescribed; and in all cases such construction shall be had, such material and apparatus employed as will insure good and satisfactory service.

20. It shall be the duty of the Traffic Committee to fix a rate to be charged for special news service, for newspaper associations, newspaper interests and news bureaus. Such rates to be a schedule of charges for exclusive use of circuit per miles per minute during any specified hour each day, and said committee shall also fix a rate per mile per minute for such service each day where no exclusive use of line is guaranteed at any specified time. Said committee shall also fix an annual rate per mile for the leasing of special circuits.

21. These By-laws may be amended by a majority vote of all the members at any annual or special meeting.

Queries

Conducted By WILLIAM W. DEAN

CONDENSERS.

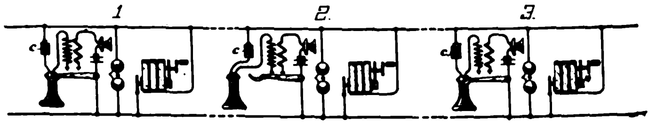
Can you tell me if there is a condenser made that is suitable for talking and ringing through, using an 80-ohm bell?—J. Y.

I have found that with a standard four-bar magneto generator an eighty ohm bell can be rung through a two micro-farad condenser, by careful adjustment. The bell will ring still better through four micro-farads; if you intend to use very many such combinations, I would advise you to use two micro-farads and then have the central office generator wound so as to give a higher voltage. By using a standard motor generator which gives 100 volts, on no load, first class ringing can be obtained with an 80 ohm bell and two micro-farad condensers.

PARTY LINE PROBLEM.

I have a party line with ten 1,000-ohm bridging telephones. When one person is ringing up another, one or more stations will break in and listen, thereby making it impossible to ring any bell on the line. What is the best remedy for this? —J. C. B.

The accompanying sketch shows what is considered the best method of remedying the defect described. In each subscriber's instrument a one-half M. F. condenser is inserted in the secondary circuit of the telephone. A one-half M. F. condenser will offer a very slight resistance to telephonic currents, but will offer a very high resistance to currents of the frequency delivered by an ordinary hand generator, so that if station No. 1 were ringing station No. 3 and station No. 2 should remove his telephone from the hook, very little of the ringing current would be lost through his telephone.



The method here disclosed is one most generally used, although some persons have tried to accomplish the same result by winding the secondary of the induction coil very high. This method does not give as good results as the one above described.

Patents

SUB-STATION CIRCUIT.

William W. Dean, of Chicago, Ill., patents (No. 722,212) and assigns to the Kellogg Switchboard & Supply Company, a subscriber's telephone circuit.

The object of this patent is to provide an improved Sub-Station circuit; it is illustrated in Figs. 1 and 2, Fig. 1 showing the circuit at the sub-station together with the cord circuit at the switchboard, while Fig. 2 is an enlarged modification of the arrangement at the sub-station. Referring to Fig. 1 the inventor provides a conductor a^1, extending from the central office to the subscriber's sub-station; here the circuit splits into two parts, one of which contains the condenser *l*, receiver f^1, and switch hook contact *7*, while the other branch of this circuit contains an impedence coil *k*. The transmitter *f* is placed beyond the switch hook *2* in the other side of the line *a*. The ringer f^3 is bridged across the line in series with the condenser *l*. The object of this invention is to provide at the sub-station a double path. Normally when the switch hook is open the condenser *e* prevents any battery from the central station from traversing the line. When the switch hook is closed the battery finds a path through the impedance coil *k;* with the switch hook open the ringer can be operated in the usual manner, while when the switch hook is closed the impedance of the bell f^3 prevents talking currents from being shunted. The impedance of the coil *k* causes the talking impulses to flow through the circuit including the receiver and the condenser. The advantage of this circuit is that the receiver is taken out of the transmitter circuit and thus the resistance of this part of the circuit to the flow of battery current from the common battery is reduced. It is also a matter of common occurrence for repair men to reverse the position of the receiver and thus injure the receiving properties of the circuit. This objection, Mr. Dean's circuit entirely obviates. Further in this circuit it is also possible to use a higher resistance receiver, and as battery current never traverses the receiver coils, a better form and more efficient receiver can be employed.

Fig. 1

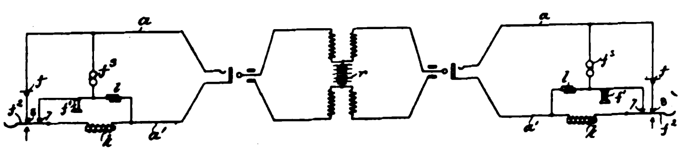
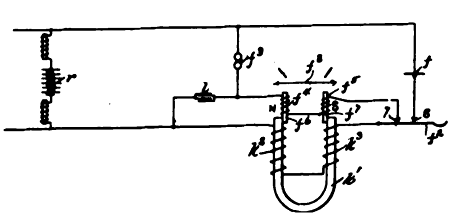


Fig. 2.



GRAPPLING DEVICE FOR CONDUIT MANHOLES.

Robert W. Lyle, of New York, N. Y., patents (No. 721,713), a grappling device for mandrels for conduit sections.

The object of this invention is to provide a method for grappling or hooking on to the mandrels, which are used in laying the various sectional forms of underground conduit. This invention is shown in Fig. 1. The end of the mandrel *2* is provided with an eye *4*. The grappling device consists of a casing *5* having a conical shaped funnel. The funnel *6* is a truncated comb in which there are several longitudinal slots 6^1. These slots are wide enough to admit the shank 8^1 of a draw rod having a knob 5^2 on its end. The mandrel and the grappling device may be in any part of the conduit, but can at once be withdrawn by pushing into the duct the draw-rod *8*, the end of which is by means of the funnel *6* guided into the slots 6^1, 6^2, etc., and thus the draw-rod engages with the grappling device and enables the mandrel to be withdrawn.

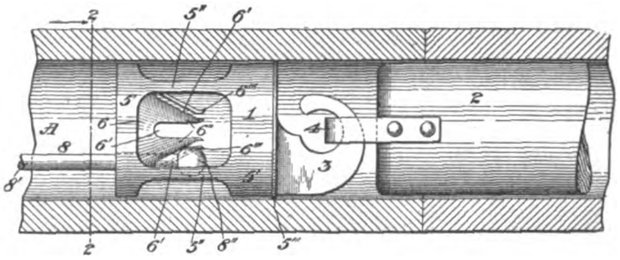


FIG. 1.

TRANSMITTER PATENT.

Albert F. Lawson, of Buffalo, N. Y., patents (No. 721,708), and assigns by direct and mesne assignment of seven-twelfths to Rensellaer W. Daniels, of Lockport, N. Y., and John Atkins, of Buffalo, N. Y., a telephone transmitter.

The object of this invention is to provide an improved telephone transmitter as shown in Fig. 1. The inventor provides a circular casing into which a speaking funnel *11* is placed. The diaphragms *2* and *2* form the sides of the casing, while a carbon button is attached in tension to both diaphragms. In this transmitter, therefore, the diaphragm operates in tension and not in compression as in the common instrument, and there are also two diaphragms to be affected by the sound waves.

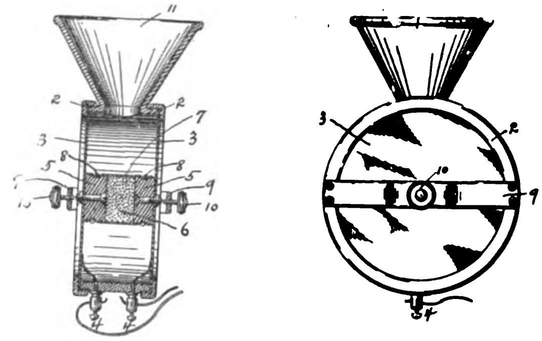


FIG. 1.

SUPPORT FOR TELEPHONE RECEIVERS.

John S. Young, of Brooklyn, N. Y., patents (No. 722,348), a telephone support.

The object of this patent is to provide an improved support for telephone receivers. It is illustrated in Fig. 1. The essential features of this invention are a clamping band *B*, bracket *R* and holder *D*, formed of metal rod or wire. By means of the clamping band the transmitter is held conveniently upon its stand, while the receiver can lie in the holder *D*.

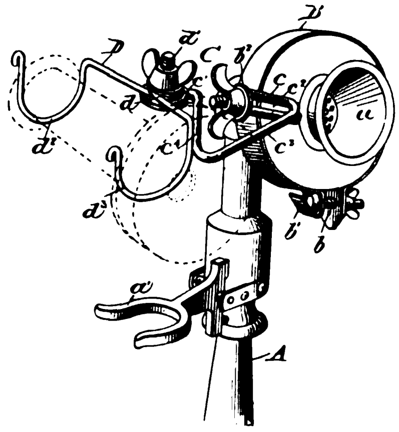


FIG. 1.

The Week's Messages.

NEW COMPANIES

McCRORY, ARK.—The M. H. Patterson Telephone Company, of McCrory, has been incorporated with a capital stock of $20,000, of which $10,000 has been subscribed; M. H. Patterson, president; Mrs. Ethel Patterson, vice-president; Miss Barbara Brazille, secretary; Miss Stella Lippman, treasurer.

DENVER, ILL.—The McClintock Mutual Telephone Company, of Denver, has been incorporated, capital, $2,490; incorporators, Joseph H. McClintock, James A. Thompson, Frank M. Powell.

GUTHRIE, ILL.—A farmers' mutual telephone line has been organized at Guthrie.

MANLIUS, ILL.—The Bureau County Mutual Telephone Company, of Manlius, has been incorporated, capital $2,500. Incorporators: J. J. Stauffer, Ben Monson, A. L. Martin.

WATSON, ILL.—The Watson and Gilmore Telephone Company has been incorporated by E. W. Tucker, C. F. Burkhart and V. C. White. The capital stock is $1,800.

WING, ILL.—Several farmers and business men of Wing have organized the Pleasant Ridge Telephone Company. Officers elected are as follows: S. L. Veiley, president; J. A. Cartes, vice-president; Francis Skinner, secretary; Edward Skinner, treasurer; W. W. Gray, trustee for three years, and Joseph Brown, trustee for two years, and J. E. Gibb, trustee for one year.

BLOOMFIELD, IND.—The New Home Telephone Company, of Bloomfield, has been incorporated with a capital of $50,000 by J. F. Slinkard and others.

CARLISLE, IND.—The Carlisle Co-operative Telephone Association has been incorporated with $10,000 capital. Directors: John Whipps, Salathiel Boon, Chas. Griffin.

FINCASTLE, IND.—The Fincastle Co-operative Telephone Company, of Putnam and Montgomery counties, has been incorporated with a capital of $420.

INDIANAPOLIS, IND.—The Banner Telephone Company, of Greenfield, has been incorporated with a capital of $60.

INDIANAPOLIS, IND.—The Star Line Telephone Company, of Brown's Chapel, Hancock County, has been incorporated with a capital of $40.

LAWRENCE, IND.—The Bell Mutual Telephone Company has been incorporated to operate in Marion, Hancock and Hamilton counties with a capital stock of $400. The incorporators are: Harley S. Offenbacker, Robert E. Bell and Asa Hamilton.

WAKARUSA, IND.—The St. Joseph Union Telephone Company has been incorporated with $10,000 capital. Directors: J. W. Strope, Jacob Weldy, et al.

LEMARS, IA.—The Lemars Telephone Company, with a capital of $50,000, recently organized, has been incorporated by the directors of the company, J. U. Sammis, E. A. Dalton, A. C. Colledge, E. Duke Haven and I. S. Mahin. The officers of the company are: J. U. Sammis, president; A. C. Colledge, vice-president; I. S. Mahin, secretary; M. H. Breen, treasurer. The capital stock of the company is divided into 500 shares of $100 each, and all stock issued is fully paid up and non-assessable. Twenty-five thousand dollars of the capital stock is issued as preferred, on which a dividend of 8 per cent. is guaranteed.

MANLY, IOWA.—The Manly Telephone Company has been incorporated with a capital of $10,000 by M. Parker, president; P. A. Bryant, secretary.

BRONSON, KAN.—A company has been organized here known as the Bronson Telephone Company for the purpose of operating a local exchange. Work has been begun on the system by putting in the poles. D. E. Holt, a Bronson business man, is promoter and manager of the company.

PLYMOUTH, MASS.—The Old Colony Automatic Telephone Company, Plymouth, has been incorporated, capital $35,000; Anthony Atwood, president; Walter G. Loring, treasurer.

JUDSON, MINN.—A meeting of farmers was held at John T. Lewis' farm in Judson recently for the purpose of organizing a Farmers' Mutual Telephone Company. It is the intention of the organizers to construct a telephone line to supply the farmers of South Bend, Judson and Butternut Valley with telephones, and it is the intention, if possible, to connect with lines at Lake Crystal, New Ulm and Mankato. D. E. Crane was elected chairman and D. Williams secretary. A committee on incorporation was appointed, consisting of D. E. Crane, G. A. Hultengren and T. J. Lewis. The following soliciting committee was selected: John Norman, Dighton Little, John T. Lewis, Dan Williams, Humphrey Lewis, David Herbert, Luther Taylor, John Addleman, Joe Lewis, Wm. Lobby, Herman Pischner, Will Shannahan, Walder Adams, J. Spencer, G. A. Hultengren, John Taylor, Albert Herbert, R. Conklin, John Kidel and Wm. J. Wigley.

LEROY, MINN.—The Leroy Telephone Company, of Leroy, has filed articles of incorporation with the Secretary of State. The officers are: President, C. Mearcklein; vice-president, Fred Henslin; secretary, Charles J. Mearcklein; treasurer, A. Edgar Henslin. The capital stock is $100,000.

REDROCK, MONT.—Though repeated requests have been made to the Bell Telephone Company to put in a service here, nothing has been done, and now it has been decided at a meeting of the business men to put in a private service, which is likely to be the nucleus of a line extending to Dillon.

CAMBRIDGE, NEB.—The Medicine Creek Telephone Company has been organized and will at once build a telephone line from Cambridge to Stockville.

LINCOLN, NEB.—The Fillmore County Telephone Company has filed articles of incorporation here with the Secretary of State. The concern, which has a capital stock of $50,000, is authorized to construct telephone exchanges in Fillmore County.

MALMO, NEB.—The Malmo Mutual Telephone Company has been organized.

SILVER CREEK, NEB.—The Silver Creek Telephone Company has been organized with an authorized capital stock of $5,000. Officers elected are: J. H. Pollard, president; Fred Johnston, secretary, and J. F. Gagen, treasurer. These officers, together with E. L. Ives and C. F. Moore, constitute the board of directors.

BOVINA, N. Y.—The Bovina and Middleteown Telephone Company, of Bovina, has been incorporated with a capital stock of $220. The directors are J. W. Elliott, F. F. Dumond and J. T. Archibald, all of New Kingston.

CANASTOTA, N. Y.—T. H. Ferns and S. B. Mosley, directors of the Home Telephone Company of Utica, have met a number of Canastota business men and discussed a plan of organizing an Independent telephone company in this village. The plan, which was received very favorably, is to organize a company here to supply service at $12 per year for residences and $24 for business places, beginning with 100 telephones or more.

CLAYTON, N. Y.—The Thousand Island Telephone Company has been organized in Clayton to furnish more complete local telephone service. Every village throughout Northern and Central New York is being equipped with a local exchange through the enterprise of Clayton capitalists. Clayton will soon have a modern local exchange and also the best of connection with the long-distance service. The incorporators are: F. L. Hall, W. H. Consaul, C. A. Ellis, W. D. Clark, G. H. McKinley, C. W. Rees and H. F. Dewey. The company will also install telephone service teo all island points. The capital stock is $3,000, which has all been subscribed.

CLIFTON PARK, N. Y.—The Clifton Park Telephone Company has been organized. Directors: W. P. Guernsey, H. C. De Long, E. J. Caldwell, E. D. White and D. Van Hyning.

TROY, N. Y.—The New York and Northern Telephone and Telegraph Company, of Troy, has been incorporated to operate from Troy to Bennington, Vt., Rensselaer, Nassau, Castleton, and in all the towns of Rensselaer County, capital $50,000; directors, F. S. Hyatt, of New York City; J. V. Jacobs, E. Gardner, J. W. Carver, J. N. Pais, N. R. Holmes and C. A. Roemer, of Troy.

TEACHEYS, N. C.—The Teacheys Bell Telephone Company, of Teacheys, has been incorporated with a capital stock of $5,000.

ATHENS, OHIO.—The Federal Creek Telephone Company has been

THE WEEK'S MESSAGES—Continued.

organized and will commence the construction of a line down Federal Creek in the near future. The company is composed of gentlemen along the route of the proposed new line, which will be connected with the Union Telephone Company's system at a point west of Bishopville.

PHALANX, OHIO.—The Phalanx and Leavittsburg Telephone Company has been incorporated. It will connect with the Warren and Niles Telephone Company. It is to be capitalized at $5,000, and the incorporators are C. J. Rood, D. H. Lieby, W. O. Chaffee, A. H. Rood, and C. F. Ives.

ST. GEORGE, S. C.—The Saint George's Telephone Company has been incorporated to maintain a system of telephones at Saint George and elsewhere. Capital, $5,000. The incorporators are: R. L. Weeks, M. S. Conner and D. S. Dukes.

LEGAL.

LINCOLN, ILL.—By her counsel, Mrs. Ida B. Parker, a widow lady of Lincoln, has begun suit in the circuit court for damages in the sum of $25,000. On Tuesday evening, December 30, Mrs. Parker called by telephone her son, Ralph B. Parker, city editor of the Courier, who, at the time, was at his desk. While awaiting the arrival of Mr. Parker the linemen of the company, it is alleged, dropped wires on an electric light wire and gave Mrs. Parker such a shock that the hearing of one ear is impaired and her nervous system is in such a condition that it is feared she is permanently injured.

FINANCIAL.

SOUTH BEND, IND.—The New Market Telephone Company, of South Bend, has increased its capital stock from $1,000 to $2,000. J. H. Arrantrout is president.

BALTIMORE, MD.—The Maryland Telephone and Telegraph Company has filed a general mortgage in favor of the Central Trust Company to secure the issue of $4,000,000 of fifty-year 5 per cent. gold bonds. Of the issue, underwritten by a syndicate organized through the Central Trust Company, $1,155,000 will be used to liquidate the floating debt. An additional $1,000,000 will be reserved to take up the old issue of bonds when they become due. The remainder of the bonds will be issued from time to time for improvements and extension.

ROCHESTER, N. Y.—At a meeting of the stockholders of the Stromberg-Carlson Telephone Manufacturing Company it was voted to increase the capital stock from $3,000,000, consisting of 15,000 shares of preferred and 15,000 shares of common stock of the par value of $100 each to $4,500,000. The total stock will consist of 15,000 shares of preferred and 30,000 shares of common stock of the par value of $100 each.

WARREN, OHIO.—The Madison Telephone Company has declared the usual semi-annual dividend of 3 per cent.

GOSFORD, PA.—The Cowanshannock Independent Telephone Company of this place has increased its capital stock from $2,500 to $7,000.

BRODHEAD, WIS.—The Brodhead Telephone Company of Brodhead has filed an amendment to its articles of incorporation, increasing its capital from $5,000 to $15,000.

FRANCHISES.

PASADENA, CAL.—The franchise for the operation of a second telephone system in this city has been sold to F. F. Graves for $1,000. Mr. Graves is supposed to represent the Pasadena syndicate operating in connection with the Home Telephone Company of Los Angeles.

PONTIAC, ILL.—City officials have in hand two applications for telephone franchises, both being Independent companies. Ray Blasdell, of this city, is asking for one, and expects to interest local capital in the installing of a system should a franchise be granted him. Another is asked for by the Streator Independent Telephone Association, which owns and operates an extensive system in Streator.

URBANA, ILL.—The Urbana city council has passed an ordinance extending the franchise of the Home Telephone Company to thirty years.

LEWIS, IA.—S. H. Albright has asked the council that a proposition be submitted to the voters at the next general election granting a twenty-year franchise to the Lewis Mutual Telephone Company for the use of switchboards. The company wants the franchise as a means of protection. This company already has several rural lines and has put in an exchange board and thirty-five instruments in the city.

SANBORN, IA.—At a meeting of the town council an ordinance was passed granting a franchise for a telephone exchange to the Citizens' Telephone Company, which is understood to be the Western Electric Telephone Company.

MANSFIELD, MASS.—At a meeting of the local board of trade the committee on telephones reported that the Old Colony Automatic Telephone and Telegraph Company is anxious to secure a franchise in Mansfield, and also Foxboro. The company is pushing this way from Southern Massachusetts. Dr. A. M. Round, president of the Farmers' Mutual Telephone Company, recently organized in Norton, told of service in that town. He said the company would gladly extend the service into Mansfield.

QUINCY, MO.—The aldermen of Qunicy, sitting as a committee of the whole, have decided in favor of giving a telephone franchise to F. L. Bill, and an ordinance to this effect will be adopted at the next meeting.

LINCOLN, NEB.—The Lincoln city council has granted a franchise to the Western Union Independent Telephone Company. The franchise granted by the ordinance is to run for fifty years from the date of its passage. The company is required to have its system in operation within eighteen months after the passage of the ordinance. Within this time it must have in operation facilities for supplying five thousand subscribers. The rates to be charged are fixed at $36 a year for long distance business telephones and $24 for long distance residence instruments. These rates may be charged when there are 1,500 telephones in operation. When 2,500 instruments are in use they may increase the rentals twenty-five cents a month, and this increase of twenty-five cents a month may be charged for every 500 additional instruments put in operation thereafter. The company is required to furnish a bond for $20,000. The company promises to pay the city $500 per year and a percentage of its gross earnings, as follows: 1 per cent. a year for the first five years; 2 per cent. for the next five years, and 3 per cent. after that.

PLANKINTON, S. DAK.—A number of the business men here are asking the city council to grant a franchise to put in a local telephone system.

MILWAUKEE, WIS.—The two pending telephone franchises asked for by the Great Western Telephone and Telegraph Company and the Milwaukee Independent Telephone Company have been placed on file. This means that the field is cleared for the new applicants, but should the old ones attempt to get back into the field they may do so without putting up another $200 for the publication of their proposed franchises.

ELECTIONS.

MOBILE, ALA.—At a meeting of the Home Telephone Company the following officers were elected: Emanuel Eichold, president; A. S. Lyons, vice-president; Adam Glass, treasurer; A. G. Levy, secretary; R. L. Douglas, assistant secretary; W. H. Bryant, manager, and the following directors: Emanuel Eichold, A. S. Lyons, Adam Glass, O. F. Cawthon, P. J. Lyons, L. C. Fry, A. H. Spira, D. R. Burgess and J. K. Glennon. A resolution was unanimously carried that a new switchboard, of the latest and most improved pattern, be installed, and the capacity of the exchange increased to double its present one.

MACON, GA.—A stockholders' meeting of the Macon-Dublin Telephone Company was held at Dublin recently and A. Daus, of this city, was elected president. The Macon-Dublin Telephone Company is a corporation chartered in Laurens county, owns the telephone line from Macon to Dublin, Wrightsville, Sandersville, Tennille, Adrian, Dexter and other points in South Georgia. It is the intention of the company to double its present capital, for the purpose of improving its present lines to a standard basis and extend them to many other places in South Georgia.

INDIANAPOLIS, IND.—The New Telephone Company, at its annual meeting, elected the following directors: A. H. Nordyke, Louis Hollweg, S. P. Sheerin, L. C. Walker, B. E. Parrott, H. B. Sale and Louis C. Reese. The board of directors has organized by the election of Mr. Sheerin president and general manager, Mr. Hollweg as vice-president and H. B. Sale secretary and treasurer. The annual report shows that the company had, on the 28th of February, 1903, 6,716 telephones, which is an increase of 1,781 during the year. The increase in 1901 was 1,170. The gross receipts from March 1, 1901, to February 28, 1902, were $141,923.45; gross receipts from March 1, 1901, to February 28, 1902, were $180,471.61, showing an increase in earnings over the previous year of $38,548.16.

GREENSFORK, IND.—The Greensfork Co-operative Telephone Company at its annual stockholders' meeting elected Enos Warfel president, Walter King secretary, and Abner Bond treasurer. The company was organized two years ago on the co-operative plan with about seventy-five members. The plant consisted of eight rural lines and seven or eight lines in town. Each line was built by the stockholders on the line and the cost of the material, switchboard, etc., was apportioned among all the members at a cost of about $40 each. Since then the number of lines has increased to thirty-two, thirteen of which are rural and the number of subscribers to 166. The lines have been extended to Economy, Williamsburg, Webster and Centerville, with free exchange with Modoc and Centerville and clear line connections with Richmond and Cambridge City. As soon as possible there will be at least three more new lines built to lighten lines that are too heavily laden.

CHATHAM, N. Y.—The West Stockbridge Mutual Telephone Company stock has all been taken and poles are being distributed over the territory to be covered, and work will begin at once in putting the line up. The stockholders have elected C. W. Sprague, president; J. S. Moore, secretary and treasurer; W. W. Bartlett, general manager, and V. R. Truesdell and F. C. Tobey, with the above, as a board of directors.

ALEXANDRIA, VA.—The stockholders of the Mount Vernon Telephone Company, which was recently chartered, met in this city and organized with the election of these officers: President, J. N. Gibbs; secretary and treasurer,

THE WEEK'S MESSAGES—Continued

F. H. Wilkinson; general manager, E. A. Thompson; board of directors, Egbert Thompson, J. N. Gibbs, Courtland Lukins, F. H. Wilkinson, Dr. S. B. Moore, A. C. Jenkins and J. W. Roberts; executive committee, E. A. Thompson, J. N. Gibbs and J. W. Roberts. Preliminaries are already on foot for the construction of the telephone line from Accotink to Mount Vernon, to connect at the latter place with the line from this city.

UNDERGROUND

BINGHAMTON, N. Y.—The common council of Binghamton has taken measures to place all electric power wires, telephone and telegraph wires in the city underground.

COMPETITION.

CLAY CITY, IND.—The Bell Company has withdrawn from its two-year struggle with the Home Telephone Company and has retired from the field, after having lost $4,000 in the venture.

COMBINATIONS.

EUREKA, ILL.—Representatives of the eighteen county telephone lines centering at Eureka met recently and decided to consolidate. A meeting will be held in the near future to effect a permanent organization and elect officers. The farmers' lines are considering a proposition of installing a central exchange of their own.

KANSAS, ILL.—C. I. Arterburn, of Westfield, has purchased the Kansas telephone exchange of Ed Dodd.

LINCOLN, ILL.—The exchange and business interests of the Lincoln Mutual Telephone Company have been sold to the Central Illinois Telephone and Telegraph Company. The deal involves a transaction of about $55,000. The Central Illinois company takes all the shares of stock in the Mutual at $250 per share, and in addition assumes all indebtedness of the company, which includes $35,000 in bonds, recently issued to pay for the new exchange of the Mutual.

WING, ILL.—The Pleasant Ridge Telephone Company and the Gannemin Telephone Company will probably be consolidated.

DUBUQUE, IA.—The Interstate Telephone Company has purchased the Epworth telephone line, owned by Joseph Lattner, of Worthington. The line has about 240 telephones in service, and has connections with a number of country towns, including Epworth, Placid, Worthington and Cascade.

NEW ORLEANS, LA.—Harvey Meyers, of the Memphis (Tenn.) Telephone Company, is here to look over the ground and possibly buy the franchise of the People's Telephone Company.

JACKSON, MINN.—The Jackson Telephone Company has absorbed the Fairmont Telephone Company's lines and equipment at this place. Negotiations have been pending for several months, and as soon as spring opens the Jackson company will make extensive improvements and construct several rural lines.

WALNUT GROVE, MO.—J. R. Vestal has sold his telephone system here to C. M. Hoffman and L. R. Head for $800.

MILES CITY, MONT.—The Custer County Telephone Line has been sold at sheriff's sale. W. H. Harris bid it in at $1,500. This amount just about covers the amount of Mr. Harris' mortgage, with interest and expenses. The original cost of the line was about $10,000.

BRISTOL, N. H.—The New Hampton Telephone Line has been sold to the Citizens' Telephone Company.

CORTLAND, N. Y.—The Cortland Home Telephone Company has certified to the Secretary of State that it has merged the Tioughnioga Telephone Company. The Cortland company had acquired all the stock of the Tioughnioga company. The certificate is signed by C. D. Van Noog, president, and H. C. Smith, secretary of the Cortland company.

CONSTRUCTION.

EUREKA SPRINGS, ARK.—A new automatic telephone system is to be established at Eureka Springs by W. M. Duncan.

EAST TORONTO, CANADA.—G. W. Ormerod, J. P., and a few other local capitalists are procuring estimates for the construction of an Independent telephone line for this town and the surrounding townships.

BEDFORD, ILL.—A new telephone line is to be constructed here. The central office will be located at Sinard and its lines will extend in various directions and also to Flora, Cisne, Mt. Erie and other neighboring towns. R. Pittiman and Tracy Pettijohn are the promoters.

HARDIN, ILL.—The directors of the Calhoun County Telephone Compony met in Hardin and perfected arrangements for a metallic circuit from the northern boundary of Calhoun county to Grafton, in Jersey county.

LEBANON, ILL.—The Lebanon Telephone Company is making arrangements to extend its service to Summerfield and an extension is contemplated north of town so that connections may be had throughout the north and northwest portion of the township.

PERRYSVILLE, IND.—The Perrysville Telephone Company is extending several of its lines and putting in a number of new telephones.

AURELIA, IOWA.—The Northern Telephone Company, of Fonda, which has been operating an exchange here for the past two years, will add five farm lines to the exchange early this spring.

CLARKSVILLE, IOWA.—An automatic exchange will be installed by the Commonwealth Telephone Company.

GERMANIA, IOWA.—H. J. Achatz and Dr. Waud, of the Kossuth County Telephone Company, say that their company is planning to build from 150 to 200 miles of toll line this summer. The company will build from Swea City to Armstrong, from Seneca to Ringstead, in Kossuth and Emmet counties, and from Tetonka to Wooden, Hancock county. It is also planning a long toll line to Estherville, Emmet county, and clear over to Forest City. It now has a line running into Elmore, Minn.

HAMBURG, IOWA.—H. C. McCortney, of the Fremont County Telephone Company, says his company will build from Hamburg to Plattsmouth, Neb., this summer. The wire has been ordered and the line will be completed at once. They are also going to put in a telephone exchange at Pacific Junction.

IOWA CITY, IOWA.—The Johnson County Telephone Company is planning to put $100,000 into the extension of its line this summer. It will build 210 miles of toll line this summer and place exchanges in Burlington and Muscatine. It is also planning to extend its toll line from Davenport to Cedar Rapids this year. The line will be built of No. 10 copper wire.

MORAVIA, IOWA.—J. L. McDonald has bought the Moravia Telephone Company of C. M. McFatridge and will improve it this spring by building a metallic circuit toll line west to Corydon, a distance of forty-five miles. He has not yet placed orders for his material.

OSKALOOSA, IOWA.—C. D. Randell, secretary and president of the Farmers' and Traders' Telephone Company, of Mahaska county, running from Oskaloosa to Fremont, states that his company is planning to build a metallic circuit to Hedrick this spring.

SEYMOUR, IOWA.—J. L. Brooks, of the Seymour Telephone Company, will extend his toll line fifty miles this summer and add about 200 city and rural telephones to his list of 640.

DETROIT, MICH.—Harper Hospital will install a private branch telephone exchange, a check for $1,000 for that purpose having been donated by Henry Stephens, a wealthy resident of Detroit. The gift of Mr. Stephens was duly accepted at a meeting of the board of the hospital, attended by C. A. Black, J. L. Hudson, Bryant Walker, Gilbert Hart, Lem W. Bowen, C. A. Kent and W. R. Farrand, and the matter of installing the plant turned over to the committee on buildings, of which Gilbert Hart is chairman. Mr. Stephens learned that St. Mary's Hospital was in similar need, and directed that institution to determine how much such a system to suit its requirements would cost, with the intention of drawing a check for the amount when the report reaches him.

MINNEAPOLIS, MINN.—The Twin City Telephone Company has purchased a lot on which it will erect a new exchange building. It now has over 10,000 subscribers and 129 private branch exchanges.

CARROLLTON, MO.—The Missouri Valley Telephone Company has ordered material to build 600 miles of line in Carroll county. These lines will all run out of Carrollton in various directions. In addition to this the Missouri Valley will build several toll lines.

MOBERLY, MO.—Mr. Graham, of Mexico, has purchased a building here. Mr. Graham is the manager of the Moberly Telephone Exchange, which will convert the building into one of the most complete telephone exchanges in this part of the State.

KENDALL, MONT.—F. H. Bacon, of the Lewistown Telephone Company, has been in this city for the purpose of securing subscribers for a city telephone service. In this he has been successful and the work of wiring the city will be commenced as soon as the weather permits.

LITTLE VALLEY, N. Y.—The Little Valley Telephone Company is stringing new circuits and making repairs on old circuits, which will put the plant in first-class shape to take care of the increase in the business.

OLEAN, N. Y.—B. G. Hubbell, of Buffalo, president of the Consolidated Telephone Company, was in Olean recently making arrangements to connect the Union Telephone Company with the Frontier exchange at Buffalo. It will not be long before the Consolidated Company has a long-distance service from Elmira to Buffalo.

RUTHERFORDTON, N. C.—John C. Mills has filed a contract with the Marion Telephone Company, of which Dob Blanton is president, to build a line from here to that place. Mr. Mills, who is the president of the Rutherfordton Telephone Company, says work will commence at once.

AMESVILLE, OHIO.—The Amesville Telephone Company is putting in a new switchboard, the old one being entirely too small for the rapidly growing business.

THE WEEK'S MESSAGES—Continued.

GLENCOE, OHIO.—James Stitt is consulting with the officials of the Belmont Telephone Company and expects soon to have a line from St. Clairsville to this place.

SPRINGFIELD, OHIO.—The Springfield-Xenia Telephone Company has been granted a permit to erect a new brick warehouse, in which it is proposed to store supplies. The building is to cost $1,000.

STEUBENVILLE, OHIO.—An agreement has been filed with the county commissioners signed by the property owners along the Smithfield and Portland pike allowing the Rush Run Avenue Telephone Company to erect and maintain telephone poles along the pike east from the village of Smithfield.

WARREN, OHIO.—The directors of the Madison Telephone Company held a meeting here recently. The reports show the company to be in excellent shape and the directors were highly pleased. Among the directors from out of town were L. R. Parker, Chicago; C. W. DeVoe, Orwell; E. U. Hyde and Dr. C. S. Fenton, Orangeville, and E. E. Howes, of Geneva. It was voted to spend from $5,000 to $10,000 for improvements at the Madison and Geneva exchanges and outlying lines.

DOYLESTOWN, PA.—The Standard Telegraph and Telephone Company has completed plans for a number of extensions and improvements to the system in Doylestown and vicinity during the coming spring, including the construction of a line from Doylestown to New Hope and one from Doylestown to New Britain, Chalfont and Lansdale, over a right of way on the railroad. Quakertown and Perkasie will also be connected with Doylestown by way of Lansdale. A direct line from Doylestown to Lansdale will also complete a direct connection between Doylestown and Norristown and tend to improve the service. Among other improvements which are planned is a new switchboard for Doylestown, to be arranged with positions for three operators.

NEW ALBANY, PA.—Ray S. Wilcox is making arrangements to build a telephone line to Overton this spring.

RIVERSIDE, PA.—The Standard Telephone Company is erecting its line at Riverside and will put in a switchboard that will accommodate 200 subscribers.

WILLS POINT, TEXAS.—The Mutual Telephone Line, erected by Joe West, of Ben Wheeler; Dr. McEachern, of Martin's Mill, and others, has been constructed to Canton. In the event of their not getting connection with the Canton exchange they will build into Wills Point. If they do get connection with that exchange they will come to Wills Point over Mr. Owens' line by a mutual arrangement.

RICHMOND, VA.—The Richmond and Aylett's Telephone Line will build a line from Etna Mills to Hanover Courthouse at once.

FAIRFIELD, WASH.—The patrons of the Barb-Wire Telephone Company have decided to increase the service this year. A central station is to be established in Fairfield, with eight connecting lines. L. N. Murphy has been engaged to take charge of the central station. The barb-wire system will be dispensed with as soon as possible and the wire placed on high poles following the same lines.

HARRINGTON, WASH.—There is talk of building a telephone line from Harrington to the ranch of John Adams, ten miles northwest of town. The proposed line would run on the poles of the Farmers' Inland Telephone Company's line. It is said the line would draw trade that goes to Rockland and Davenport. Farmers expect to build the line. A telephone line will be built from Sprague to the California ranch in Lord's Valley. There connection can be had to Harrington. The Harrington Bank and T. C. Lakin are the chief promoters.

BELLEVILLE, WIS.—The Belleville Telephone Company will enlarge its business this spring by extending its line north and east from here. When the local exchange was first started it was only intended to supply the village, but it was finally concluded to extend to the country and this will now make the second extension.

MISCELLANEOUS

FORT WILLIAM, ONT., CAN.—The town hall, containing the municipal telephone exchange, was totally destroyed by fire. Loss to telephone exchange, $6,000; insured for $3,000.

MUNCIE, IND.—All the union linemen in the employ of the Central Union Telephone Company have been on strike for a week because the company was employing men not members of the Brotherhood of Electrical Workers. Chicago representatives of the company endeavored in vain to pacify the recalcitrants. Linemen from other cities were brought here, but all but one or two of them were induced to leave town again. Subscribers generally are in sympathy with the men, and many have ordered their telephones out. Both sides have given up efforts at reconciliation, and it is to be a fight to the finish.

MANHATTAN, KANS.—A meeting was held here recently by a number of telephone men for the purpose of consolidating the toll lines west of Topeka. The plans are as yet uncompleted. The corporation will build a trunk line west of Topeka. Those from out of town who attended the meeting are F. W. Dougherty and G. G. Hill, of Concordia; W. W. Dilworth and F. M. Dailey, of Beloit; F. L. Flint, of Minneapolis; C. L. Brown, George Rodgers, of Abilene; F. W. Dorn, of Junction City, and H. L. Pierce, of Belleville.

BOSTON, MASS.—The Massachusetts Telephone Company, which has its headquarters at No. 185 Franklin street, where it has an exchange in operation, has determined to begin active business in the territory covered by its subway construction. The company has subway construction in a large business district of Boston, and feels that it will be able to give service that will be very valuable to the business interests within the territory. It will make a canvass for business at the rate of $4 per month for the service rendered. This company is owned by the Telephone, Telegraph and Cable Company, of New York, and has been lying dormant for some time.

ST. JOSEPH, MO.—More than fifty farmers attended a meeting here recently, called for a discussion of Independent telephone lines which it is proposed to build through the rural neighborhoods of the county. E. J. Kellogg, of Craig, Mo., addressed the meeting in the matter of rural telephones.

CANAAN, N. Y.—The Canaan Co-Operative Telephone Company is to erect a line from East Chatham to Riders Mills.

CLYDE, N. Y.—The Wayne County Telephone Company, between now and next fall, will extend its lines to Rochester via Lyons, Phelps and Canandaigua. Walworth parties are importuning the company to give that village a town service.

COHOES, N. Y.—At the Cohoes and Waterford Home Telephone office there are now in operation over 100 telephones. It is expected that by the first of next week there will be over 200 in use. As soon as the weather permits the circuit to Troy will be connected. A cable will have to be carried across the river between this city and Troy. The service is now being given free, but after April 1 charges will be made.

JAMESTOWN, N. Y.—Arrangements have been completed between the Interocean Telephone Company, the Home Company, of this city, and the Warren Telephone and Telegraph Company, of Warren, Pa., whereby a new line of telephonic communication has been opened up between Jamestown and Warren.

MANCHESTER, N. Y.—The Interocean Telephone Company, of Buffalo, is looking for a route where it can run its poles into this village and connect with Osgood's Independent telephone system, which is giving excellent service in this village and Shortsville.

NEW HARTFORD, N. Y.—The Home Telephone Company, of Utica, will open an exchange in this village some time during next month. Mr. John Ganey will be manager.

ONEIDA, N. Y.—The Oneida Telephone Company has closed its exchange in the Devereaux Building and has begun the work of cutting out the wires. It is stated that this does not signify that the company has suspended operations and abandoned the field, but that its exchange will not be reopened until its system has been rebuilt. Meanwhile the sub-station will be maintained.

SYRACUSE, N. Y.—The Syracuse Telephone Company is making arrangements to extend its line from Syracuse to Phoenix, where it will meet the line of the Ontario company of Oswego.

COLUMBIA, N. C.—The Albigaton Telephone Company's line from Columbia to Gum Neck is now completed and in fine working order.

MARYSVILLE, OHIO.—N. E. Liggett, owner of the Marysville Telephone Company, has decided to organize the concern as a stock company. He will do this in order to secure money to make improvements.

GREENEVILLE, TENN.—An important meeting of representatives of Independent telephone lines was held in the court house here recently. There are a large number of such lines in Green county. The object of the meeting was to devise a way by which all subscribers to the Independent companies may have free communication with subscribers in other companies throughout the county. Representatives of about twenty-five lines were present, representing about 300 telephones and about 350 miles of wire. No definite action was taken, but a committee was appointed to report to a future meeting.

WILMINGTON, VA.—The Fluvanna and James River Valley Telephone Company expect to have its line to Richmond completed soon.

PERSONAL

SAVANNAH, MO.—At the last meeting of the Mutual Telephone Company directors J. I. Bennett was chosen general manager of the lines.

MAHANOY, PA.—R. E. C. Foye, local manager of the United Telephone and Telegraph Company, has resigned his position. He is succeeded by B. L. Simpson, of Ashland.

PHOENIXVILLE, PA.—Charles E. Wehler, who has been manager of the United Telephone and Telegraph Company's interests in Phoenixville and vicinity for fifteen months, has tendered his resignation. Norman D. Barnard, of West Chester, has been appointed to succeed him.

TRADE NOTES

The Chicago and Northwestern Railway has four trains daily running between Chicago and St. Paul-Minneapolis.

The Gordon Battery Company, New York, has issued a very neat little catalogue describing the Standard Gordon Cell. The book consists of 40 pages, with nearly that number of fine illustrations of the different types of Gordon cells.

The H. B. Camp Company is sending out two very handsome booklets describing the Camp product. The larger of these tells of the very first efforts to lay wires underground by means of a reel mounted on a plow, drawn by sixteen "yoke of cattle," and is very interesting.

G. M. Gest, the conduit contractor, has been awarded a large contract for the underground conduit work in and around the L Street Central Station of the Edison Electric Illuminating Company, of Boston, Mass. This construction will be very heavy, having 186 ducts in one trench.

The Clark Automatic Telephone Switchboard Company, of Providence, R. I., is sending out a catalogue illustrating its automatic telephones for intercommunicating and small village systems. The catalogue fully illustrates the automatic system and contains opinions and letters from many satisfied patrons.

The American Conduit Company, manufacturers of the bituminous fiber conduit has issued one of the handsomest catalogues of the year. The subject matter, typographical make-up and effects are all that can be desired. On nearly every page are fine half-tone engravings illustrating the products of the company, a construction scene, etc.

The Eureka Electric Company, 143 Clinton street, Chicago, reports a very large sale of its new transmitter. This transmitter in addition to being non-infringing is claimed to be the only absolutely moisture proof and non-packing transmitter made. The company sets forth very strong claims for this transmitter and its claims are supported by a very ready demand on the part of the telephone buying public.

The C. J. Huebel Company, producers of cedar poles, has gone to the expense of concentrating 25,000 poles at its Menominee, Mich., yard, which makes possible the prompt shipment of orders. From present indications it appears that there will be a large demand for poles this year, causing an increase in present prices, so that telephone companies contemplating line construction will do well to order immediately.

The Standard Vitrified Conduit Company, New York, has issued something new and novel in the catalogue line. The cover is printed to represent two sections of a six-duct conduit and is cut to the required shape. There are over 65 pages in the book and every one of them is extremely interesting, showing all the various types of conduit made by the company, the methods of laying, etc. This catalogue was gotten up under the direction of Mr. B. S. Barnard, secretary of the company.

The Automatic Electric Company, of Chicago, has received an order from the Delaware County Telephone Company, of Manchester, Iowa, for an automatic switchboard of 1,000 capacity with a present installation of 300 lines. Manchester has had automatic telephone service for seven years, the company being one of the early purchasers of automatic apparatus. The business has outgrown the ultimate capacity of the board now in use, and the new equipment was purchased to meet the increasing demands for service.

The Pittsburg and Lake Superior Iron Company has just disposed of poles to the value of $143,000. As nearly every telephone company now has its own specifications on the poles it uses, it has been decided by this company to establish a sorting yard at Escanaba, Mich. To this point all poles will be shipped and then sorted to conform to the demands of the trade. It is figured that the cost of concentration will be more than offset by the advantages to be derived from the more satisfactory filling of orders.

The Only Manufacturing Company, Moravia, Iowa, uses very convincing arguments in advertising its Only Tie-Wire Former. For instance: In Iowa alone, as per state assessment 1901, there were 31,920,977 miles of telephone and telegraph wire—enough to girdle this earth nearly 1,300 times—on which, allowing 35 tie-wires to the mile, there would be the enormous sum of 1,118,234,195 tie-wires. Allowing 9 inches to each tie wire, they would reach 158,810 miles, or enough to encircle the earth over 6 times. The moral pointed from these figures is that telephone companies should think how their tie-wires are made.

CONTRACTS FOR PITTSBURG CO.

The Pittsburg & Allegheny Telephone Company, of Pittsburg, Pa., has just closed a contract with the Westinghouse Electric & Manufacturing Company for telephone service, which will provide a telephone in every single department of that company at its large works at East Pittsburg and in many of the departments a number of telephones, aggregating in all over 300. A large number of these telephones are already in working order and Pittsburg connection has been established. This is probably the most important contract that this company has closed since its advent in Pittsburg.

In addition to this, the company has also closed within the last thirty days a contract with the Pennsylvania Company for a telephone at each of its freight points. Both of these contracts were secured solely on the merits of the quality of the service which this company has been rendering and are indications of still bigger things in the future and of the firm foothold which the company has obtained in Pittsburg and vicinity.

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

INDEPENDENT Telephone Plant, incorporated, in 22,000 town, 650 telephones in operation; steady increase in business; central energy multiple board all new. Will sell on basis of 9 per cent. of net of last six months' business. Perpetual franchise; 50 outside toll connections. Write for full particulars to 263 Rosewood Avenue, Kankakee, Ill.

FOR SALE.—One brand new Eureka 100-drop express switchboard and chair; one brand new 10-drop Standard switchboard; will guarantee them and sell at a bargain. Address A. C. SCRIBNER, 30 2d Ave., Gloversville, N. Y.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

POSITION as manager or superintendent of exchange from 200 to 300 lines; 5 years' experience on board and outside, and toll lines. Age 37; married with family; sober and industrious. Address A. W. CRIPPS, Harrison, Ark.

TOLL TICKETS.—You use them every day. 5,000, two colors, firm name, excellent design, postpaid, $2.50. Cash with order, but American Telephone Journal knows we are O. K. Write for samples. THE STUDENTS' PRESS, ALBION, MICHIGAN.

POSITION as INSPECTOR or TROUBLEMAN. Several years' experience and best of references. Address, BOX 38, care The American Telephone Journal, New York.

TELEPHONE SALESMAN wanted by prominent manufacturer; only those with experience on the road need apply; state salary, references and give full particulars. Address BOX 37, care American Telephone Journal, New York.

POSITION as superintendent or manager of telephone company. Eight years' experience in managing and building exchanges and toll lines. At present superintendent of construction, large Independent company. Best of references. Will be open for position after April 1st. Address Lock BOX 11, RECTOR, ARKANSAS.

The American Telephone Journal

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SOME STEPS IN THE EVOLUTION OF CIRCUIT DESIGN—COMMON BATTERY CORD CIRCUIT

By J. C. Kelsey.—*ARTICLE XI.*

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THE self-restoring drop system had battery on the sleeve of the plug, which found a path through the restoring winding, when the sleeve came into contact with the ring of the jack. In the common battery circuit a change is made, and the battery from the sleeve of the plug finds a path through the cut-off relay R^2 Fig. 74, which cuts off the line relay R^1 and extinguishes the lamp.

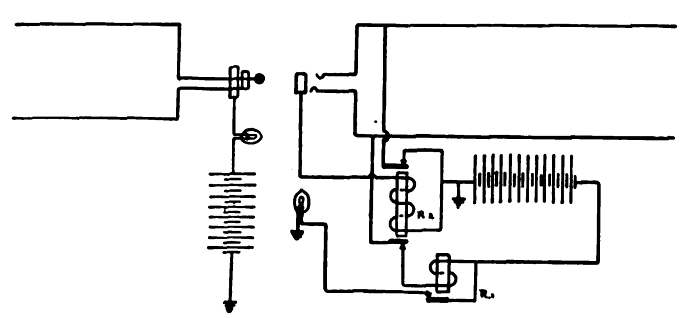

FIG. 74.

This act of cutting off the line relay requires a change in the clearing out signal, which, heretofore, has been a drop. In the common battery system all the subscribers' signals are given by the movement of the switch hook. This cannot actuate a drop, and now some means must be given the operator to know the condition of the subscriber's telephone, whether or not it is off the hook. The best arrangement is one which will light a lamp in the cord circuit, while the telephone is on the hook, and will extinguish it when the party is talking, making service automatic and disconnection rapid.

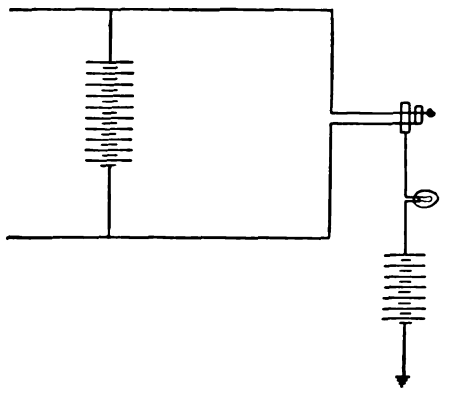

FIG. 75.

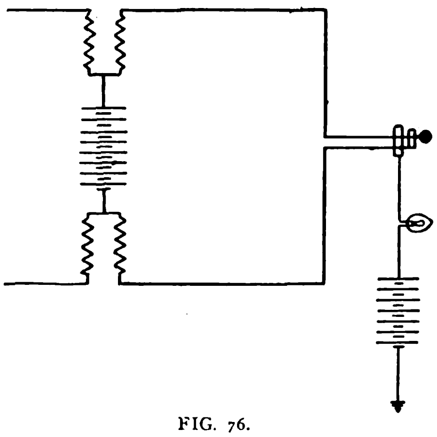

FIG. 76.

As battery exists on the sleeve of the plug, assume a lamp in series, between the battery and the sleeve, which lights when the plug is inserted in the jack, according to Fig. 74, at the same time the cut-off relay is opened. But opening the cut-off relay deprives the subscriber of battery, and he cannot talk, so the act of plugging must reintroduce battery, and this is the origin of the vicious clicking in the ear, just before Central speaks. It is caused by the cutting off process, for the induction coil of the telephone is charged. The sudden opening of the line allows it to discharge and expend itself in the receiver.

If all the cord circuits were furnished battery, as shown in Fig. 75, the system would be in a sorry plight from cross-talk, so impedances are inserted between the battery and the sides of the cord circuit, according to Fig. 76, which shows an ordinary repeating coil, with the middle terminals attached to the battery. Each winding of the coil is about 20 ohms, with enough iron in the core to prevent any stray impulses from other cord circuits.

Still the circuit is deficient, for at present nothing affects the cord lamp, whether the subscriber's telephone is off the hook or not. How shall this lamp be made to signal the position of the receiver? The answer is, put in another relay, placed in the cord circuit according to Fig. 77, between the ring of the plug, and the battery in such a manner that it shall control the lamp circuit.

But we all know that it is undesirable to have a relay directly in the talking circuit. How can we obviate this objection? By providing a path for the voice currents around the relay that is now inductive.

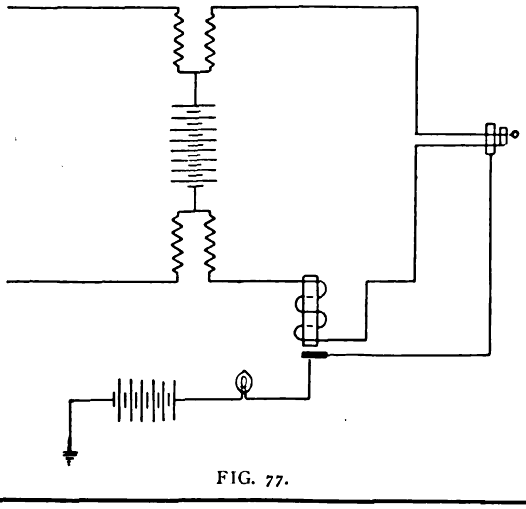

FIG. 77.

Fig. 78 shows the two windings of the non-inductive relay. In this case, the copper winding or the inductive winding is wound close to the core, and the German silver winding of few turns on the outside. The non-inductive winding has nine times the resistance of the inductive winding, and consequently takes but a small fraction of the exciting current, and only weakens the relay but slightly.

If a lamp is paralleled by a shunt of one-third its own hot resistance, it is unable to receive sufficient current to heat the filament to more than a dull red. This is taken advantage of in extinguishing the cord lamp. Fig. 79 shows the non-inductive relay contacts in the act of closing a resistance $1/3R$, about the lamp, R, which will cause the filament to burn a dull red. In addition, an opalescent shade is placed over the lamp, which, when the filament is reduced to a dull red, gives the effect of total extinguishment, and which, when lighted, mellows the light rays so that they are not offensive to the eye.

In a succeeding paper the application of the shunt to the answering cord circuit will be shown, and the description of the common battery cord circuit concluded.

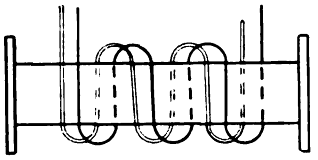

FIG. 78.

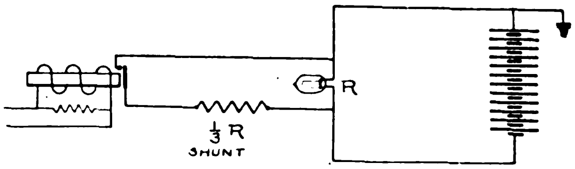

FIG. 79.

CONTEMPORARY CROSS TALK

By "The Listening Key."

IN our usual discursive and absurdly inconsequent style, we switched off in our last talk from our search for a unit in the central office to a brief and playful consideration of the use made of the multiple board in the old controversy anent telephone rates being higher in larger systems than in small. Coming back to our muttons, or rather to the particular section of mutton we were discussing, we said that "when we come to a multiple exchange any real unit of equipment per subscriber vanishes amid a cloud of complication." The first complication arises, of course, from the multiple character of the switchboard. If you increase the capacity of your switchboard you not only increase its total cost, but you increase the equipment of each line. Consequently the capital cost of the switchboard plant of each line and the corresponding maintenance and depreciation expenses are not fixed, but variable quantities. This is further complicated by the fact that both the original capacity and the additional capacity of the switchboard must always be in advance of the actual requirements. This margin of spare capacity will naturally vary as the number of lines connected varies. So that in a multiple switchboard it is impossible to have a fixed unit of equipment per line; the amount of plant in use (and the amount of capital invested) per working line varies almost from day to day.

Unit of Equipment Hopeless

The state of affairs just described obtains even in a single exchange system worked by means of a multiple board. But when we come to a large system with several exchanges and consequent trunk working, and with the great variations in traffic always present in a large system, the search for a unit of switchboard equipment becomes quite hopeless. The trunk equipment at once adds considerably to the expense and complication of the switchboard, and the amount required for each line naturally varies in accordance with the traffic expected from each line. The amount of outgoing trunk equipment will be dependent on the amount of traffic originated at the exchange where it is fitted, whereas the amount of incoming trunk equipment is dependent on the amount of outgoing trunk traffic originated at other exchanges. One exchange in a system may have very little trunked traffic and others a great deal; one may send very little traffic to the others and receive much from them. So that the amount of equipment in one exchange may be in part determined by the nature of the traffic originating at another exchange. Under these circumstances a unit of central office equipment per subscriber's line is most difficult to arrive at.

The Basic Principle

Then we come to the real crux of the question—the influence of the traffic of a line on the central office equipment of that particular line. It is easy to see that the size of a multiple switchboard must depend mainly on the daily amount of traffic it is to deal with. Assuming that an operator handles a thousand calls a day, and that the lines in a given system average ten calls a day each, then one hundred lines can be terminated at a position and a switchboard for three thousand lines will consist of ten sections. If the average daily traffic per line be only five calls, two hundred lines can be terminated at a position, and the number of sections required for three thousand lines will be five only, while if the traffic go up to twenty daily calls per line, each position can carry but fifty lines, and a switchboard of twenty sections will be required for three thousand lines. Incidentally here it may be pointed out that the operating efficiency has a direct bearing on the size of the switchboard, since on the operating efficiency depends the number of daily calls that can be handled at a position. But apart from that, and assuming for the nonce that all operating is equally efficient, the ruling factor in determining the size of a switchboard is the amount of daily traffic to be carried.

Averages Mean Nothing

In the foregoing illustration we have spoken of the average traffic per line, but we have seen by our previous discussions of traffic that in a large system averages do not afford reliable guides, and that when we come to consider individual cases the average figure means practically nothing or conveys a wholly wrong impression. Even taking average figures it is plain that the daily traffic per line will influence the amount of central office equipment per line very seriously, and that the unit of equipment per line will be quite different when the average traffic is five calls daily from what it will be if an average of twenty calls daily must be allowed for. In the one case we have a switchboard of but five sections and in the other one of twenty sections for the same number of subscribers' lines. This contrast gives a hint of the danger that lurks behind such an invitation as "Talk as much as you like." A set of subscribers who responded freely to this invitation might easily double their average traffic in the course of a year or so, and, if the standard of service were maintained, cause very serious embarrassment to the management.

Traffic Regulates Expenses

It is when we come to examine the traffic of each individual line in a large system that we see how thoroughly unreliable is the average figure and how entirely hopeless it is to arrive at any precise unit of central office equipment per subscriber. As has already been pointed out quite often, the traffic of different lines in a large system varies very widely, ranging all the way from a daily average of between one and two calls up to a daily average of between fifty and a hundred. We have seen that the daily traffic regulates the size of the switchboard, and therefore the space occupied by the operating room. Consequently the size of the exchange building and the area of ground it is to occupy are ultimately dependent on the amount of daily traffic to be carried. A line that originates only one or two calls a day takes up less switchboard space, and therefore less building and land than a line which originates fifty or sixty calls a day. For the two lines you have *apparently* an equal amount of plant in each case. Each line has its answering jack and line signal and its multiple line and jacks, and if the exchange has incoming trunks each line must also be multipled through the incoming trunk sections. But the equality of equipment is only apparent, and quickly disappears on investigation.

A UNIFORM SYSTEM OF TOLL LINE ACCOUNTS*

By Miss Flora B. Herr.

With many different companies carrying their toll messages over lines other than their own, it becomes absolutely necessary to have harmony and uniformity. Some of these companies pay the other companies for the carrying; some pay terminal fees, some pro rata mileage, while others keep all tolls coming in, and expect each and every other company to do likewise. Perhaps the last named method is fair, and perhaps it is not. But for the benefit of those who do pay, it is important that all records should be kept in the same manner, that there may not be a discrepancy at the end of the month. Along with keeping the reports in a uniform manner, it is necessary to check with more than one station if possible.

The value of checking is seen by some of the larger companies; and they demand that all reports come in to the Central Office by the 5th of each month. Then with a pile of reports a foot high, arranged alphabetically, two or three begin work.

This takes work and care and keeps the reports a month behind, but a more even and just settlement is made. Since, however, there is not a single station or large company owning the principal lines in Iowa, it becomes necessary for the stations to check with each other.

The Ottumwa Telephone Co. has checked weekly with a number of companies, all of which do not make monthly settlement, but for the mutual helpfulness, the checking is made. It works like this: Fairfield reports on Monday, March 2d, three messages received from Ottumwa. Ottumwa has one message sent. Fairfield is asked for copies of the tickets on that day. Among these, Ottumwa finds her one good ticket and also that she has one marked N. G., while the third cannot be found at all. Since the message was sent only a week before, and since the time is also marked on the ticket, the clerk can go to the operator who is on duty at that time and ask if she knows anything about these tickets.

"Why, yes. Mr. 'B' talked to Fairfield last Monday. Don't you find the tickets?"

"Well why is this ticket marked N. G.?"

"They talked so short a time, that I thought they did not get their parties," etc. Now Ottumwa can collect for those two messages, which otherwise, would have been lost.

If Fairfield reports eight sent messages, and Ottumwa has nine good tickets received, the clerk copies the nine tickets and from these, Fairfield can find the missing ticket and collect 25 cents which would have been lost otherwise. It takes only a few of these tickets to make a dollar.

This is enough to prove that the toll reports in Ottumwa and Fairfield should be kept in the same manner. In taking up the points under the toll work, first consider the operator. Girls with good carrying voices and voices heavy enough to be heard easily, should be selected. They should always use the rising inflection. Then promptness and dispatch should be used in giving messages to an operator by another operator, as a message sent from Ottumwa to Des Moines. Ottumwa should ring Oskaloosa, and say "Hello, Oskaloosa, ring Knoxville." When Knoxville is on the line, "Hello Knoxville, ring Des Moines." Or, *if* thought advisable by the companies, the Ottumwa operator might ring Oskaloosa, and say, "Hello, Oskaloosa, John Smith, of Des Moines, for James Brown at Ottumwa." Then she dismisses the ringing until she is again rung; or if a rush message she could stay on the line, even while attending to other messages. If this method of sending messages were employed, instead of the operator asking so many questions and making so many explanations to Oskaloosa, and then repeating them to Knoxville, the message could be sent much more rapidly.

Always give the name or telephone number of the party calling, as well as the people called. If, in the case of the Fairfield messages mentioned before, those two missing tickets had come back to Ottumwa in this manner: "Central (Ottumwa) to 71 Fairfield and Central Ottumwa, to 942 Fairfield," Ottumwa would surely have lose those messenger fees, since Fairfield could not be asked to enquire to whom 71 talked on March 6.

The disposition of the operator is a great help or disadvantage in expediting or retarding a message. The operator in one station, should not hold the line, simply because she is displeased about something another operator has done. This occurs rather frequently with Ottumwa messages over one or two lines.

A uniform time for beginning and closing the day should be adopted. Ottumwa and a few companies near, close the day at 6 o'clock. Reports can then be made and mailed Saturday evening, reaching the other office Monday afternoon or Tuesday. All tickets after 6 o'clock in the evening will be dated the next day. When the collector takes a toll bill to a patron, he says, "I didn't talk on the 12th." So there must be some way of keeping time. And Ottumwa has midnight "C," One A. M. (1) Two A. M. (2) Three A. M. (3), etc., until 12 M., which is 12. Then One P. M. becomes 13. Two P. M., 14. Three P. M., 15. Four P. M., 16. Five P. M., 17. Six P. M, 18. A bill in the hands of the collector, marked March 12th, 18-15 for example, means that the party talked March 11th, 6-15 P. M. There is difficulty in the rush of the day to have the girls, always, mark A. M. and P. M. This method of keeping the day, obviates that difficulty.

Another advantage of closing the day at 6 P. M., is the amount of clerical work which the night operator can do. She can arrange the tickets in the proper order and keep many of the records after the hours of midnight, and the night girl can thus save the crowding of the chief's day.

Each station has its own method of keeping toll accounts.

______ Station.

Rate ______ **Month of** ______ **190**

	OUTWARD						INWARD						THROUGH		THROUGH STATION		
	No Mess		Mess	R	D H	F	No Mess.		Mess.	R	D H	F	No Mess	Fail			
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

(Should be ruled to accommodate 31 days.)

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*Abstract of paper read before Iowa Association Convention, Des Moines, March 17 and 18, 1903.

That is a part of their bookkeeping. Of course the manner of collecting in one company will not affect another company. But each station should keep account of *all calls.* Some destroy all the through calls and all the calls which failed during the day. This should not be done, as sometimes, one station marks a ticket N. G., when another station knows that the call was good. They should also keep the tickets long enough to cover the statutory reserve. In two years, a great many tickets will accumulate. But by having the original ticket, the company may save itself a law suit or other disagreeable complications.

A good way to keep the tickets is in boxes made especially for that purpose. Boxes which are just wide enough for the ticket and long enough to hold a month's work. They can then be kept together and arranged alphabetically in stations, having a heavy blank card between each station. Then if it is desired to know how many calls were sent to Washington or Davenport on March 9th, look under the W's and D's, for Washington and Davenport. Take out only those tickets, and do not disturb the others. When they are counted, put them back in place. A good way to arrange the tickets in the box, is "sents," "reversed," "dead heads," and "N. G.'s." The "received" arranged in the same way, "good," "reversed," "dead heads," and "N. G.'s," the "through tickets" following. Place them in this order each day in the box. If a color scheme is used, the eye can detect each day's work at once. At the end of the month, put the box away, and at the end of two years there will be twenty-four boxes of tickets, arranged in an orderly manner.

Now in regard to keeping the record of those tickets, I have prepared a blank, which seems to be as simple a method of keeping the record of all the tickets possible. The blank is of a size that may be kept in a binder which may be found at any stationer. (See accompanying illustration of blank.) The dates are printed on the left hand side, outside the red line. At the top of the blank is a place for stations, rate and month. The body of the blank is divided into "outward," "inward" and "through" stations. The "outwards" are divided into "No. mess," followed by a narrow blank space, then "mess. fees," then "reversed"; following comes "dead heads." The space marked "inward," is divided in the same way. The space marked "through" is divided into "No. mess." and "fails." "Through station" is left blank for writing the name to which the message was sent. The date may be written lightly along the margin so that there can be no doubt as to the date of any given "through," without looking at the ticket. The space immediately following the number of messages is left for correcting a message after the checking by another station has been done.

FOREIGN CURRENTS

By *"The Arrester."*

NEW municipal telephone schemes are not appearing at a very active rate in Great Britain. The town of Hull advertised for tenders for telephone equipment for a municipal system, specifying seventeen different contracts for different kinds of material, ranging all the way from insulators up to exchange switchboards. The advertisement was dated January 26, and its first appearance in the technical journals was in the issues of February 5 and 6; as the tenders were to be in by February 18, American manufacturers not having agents on the spot had no chance of putting in bids.

Another Report by Mr. Bennett

Mr. A. R. Bennett has made a characteristic report to the Town Council of Barrow-in-Furness, desirous of embarking in municipal telephony. Taking 500 subscribers as a basis, Mr. Bennett thinks an exchange could be profitably worked on an unlimited service tariff of $29.40, with an alternative toll rate of $17.50 *plus* two cents per call. At present the National Telephone Company charges $37.50 for unlimited service, and it has about 300 subscibers in the area, which is considered rather a small number for the size of the place. Mr. Bennett's scheme provides for underground work in the chief streets to accommodate up to 1,200 working lines. His capital estimate is $70,000 for an installation capable of dealing with 500 lines. On an average receipt of $25 a line, with some small extras, he calculates that the gross revenue would be $13,750, more than enough to cover all working expenses and capital charges. He believes that the National would hardly attempt to cut rates in the town and that the corporation would have no difficulty in securing the required 500 subscribers within a fairly short time.

National Company's Report

The figures contained in the half-yearly report of the National Telephone Company for the six months ended December 31 last give some idea of the solidity of the concern that the municipal systems have to compete with. The gross revenue for the six months was $4,342,310, compared with $4,007,475 for the corresponding period of 1901, an increase of $334,835. The working expenses amounted to $2,366,335, compared with $2,221,955, an increase of $144,380. The net result (after deducting post-office royalties amounting to 393,205) is a profit balance of $1,582,765, compared with $1,418,400, an increase of $164,365. The rentals carried forward for unexpired terms of running contracts amount to $3,855,510, compared with $3,653,125, an increase of $202,385. Dividends of from 4½ to 6 per cent. on the different classes of stock are declared, $525,000 is transferred to reserve and $62,250 carried forward. During the half-year $1,295,295 was expended on capital account in the construction of 12,286 additional exchange and private stations and of underground lines in various parts of the system. Truly the telephone business on a large scale is a flourishing institution.

Transatlantic Wireless Telegraphy

The recent experiments in Transatlantic wireless telegraphy come in for a good deal of notice from the English technical journals, and from all accounts the famous messages between President Roosevelt and King Edward seem to have been rather an unfortunate advertisement for the Marconi company. It is now undisputed that the King's message was transmitted by cable, and the reason has been given that the Poldhu station was not strong enough to send it by the wireless route. According to the report in a recent issue of the London *Electrician,* however, Mr. Marconi, in an interview on landing at Liverpool, circumstantially stated that the King's message was sent by the wireless system. The Liverpool papers' report of the interview was as follows: "Can you tell me if the arrangements for sending off President Roosevelt's message to King Edward were carried out without a hitch?—Yes; certainly they were. Everything passed off very well.—And what about King Edward's wireless message to the President?—That was received by the wireless apparatus at the other side.—Then it is not true, as has been said in England and elsewhere, that the King's reply to the President of the United States was sent by cable?—No; it was not so. The message was received in the ordinary way. That is, of course, by wireless telegraphy." There does not seem much room for misunderstanding in the double question and double reply, but Mr. Marconi subsequently wrote to the papers saying that he had been misreported, and that the King's message had been sent by cable.

Commercial Wireless Service Possible

However, in spite of the lack of agreement among the staff of the Marconi Company as to what they should say about the King's message, the fact remains that wireless messages have passed across the Atlantic, even if so far they have passed in one direction only, and that a commercial wireless service is at any rate a possibility of the future. Whether all the uncertainties attendant on long distance wireless transmission can be overcome sufficiently to ensure a steady commercial service, the future alone can show. But at least it can be said, although the two problems are entirely different, that the present difficulties and uncertainties of the wireless system are no greater than those of the first Atlantic cable of nearly fifty years ago, which failed completely, almost immediately after it was laid. It took nearly ten years to establish a commercially successful Atlantic cable service.

TELEPHONE EXCHANGE ENGINEERING—ARTICLE V

By Ray H. Manson, Albion D. T. Libby and Charles A. Simpson.

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RINGING MACHINES: A duplicate set of Holtzer-Cabot ringing machines, with don't answer, busyback and machine ringing attachments, shall be supplied for furnishing all ringing and special signaling currents. One of the ringing machines shall be designed to run from a 220-volt D. C. circuit and the other from the storage battery. Each of the ringing machines shall deliver alternating and pulsating currents at a voltage and frequency and be of a capacity sufficient to meet the needs of the ultimate equipment of the exchange without undue heating. The battery-driven ringing machine shall be so designed and its circuit so arranged as to prevent the introducing of noise on the lines through the battery.

Storage Batteries: A storage battery plant of suitable size and capacity, capable of running the exchange for twenty-four hours without charging, shall be provided, and designed to fulfill the maximum requirements of the ultimate capacity of the exchange. Only the number of plates necessary for the operation of the present equipment shall be installed under this specification. All battery leads and bus-bars shall be of copper and of sufficient size to insure freedom from cross talk. The lugs of the several cells shall be burned together and to the bus-bars in a thorough and workmanlike manner. A tap shall be taken at each bus-bar to the power board for measuring the voltage of each cell. A hydrometer and the necessary amount of electrolyte of the proper specific gravity shall be provided and the batteries fully charged before turning over to the purchaser. The battery shall be of the "chloride" type.

WIRES AND CABLES.

All conductors shall be of soft copper of not less than 97 per cent. pure, and shall be so arranged and protected as to be entirely free from cross talk or other inductive disturbances.

All cable forms shall be uniform as regards spacing and arrangement of conductors, and shall be carefully laced with strong waxed linen twine and thoroughly impregnated with beeswax, the whole being treated to a light coat of white shellac. Sufficient length of skinner shall be used so that the apparatus to which the cable conductors are soldered can be readily taken out of its position without disturbing other adjacent apparatus or cabling.

The arrangement of the cabling and wiring shall be such that no change will be necessary when additions are made to the switchboard up to the ultimate capacity, other than the addition of the new apparatus and conductors.

All connections of cables and wires shall be through terminals and clips, the joints being first made mechanically, then thoroughly and neatly soldered. There shall be no joints or splices made in the wire itself, and all cables and wires must be continuous from one terminal to another.

These specifications cover the furnishing and installing of all conductors from the line side of the main distributing frame throughout the exchange.

Machine-Made Cables: As far as possible, all switchboard cables shall be machine-made, having conductors of tinned copper wire not smaller than 24 B. & S. gauge. Each wire shall have an inner wrapping of silk and an outside wrapping of cotton, and shall be twisted in pairs and formed into a cable with a neat and substantial moisture-proof covering. Each pair of wires shall be distinguished by a specially arranged combination of colors, and this color code shall be maintained throughout the installation. The dye used in coloring shall be of such a nature as not to impair the insulation of the conductors.

Machine-made cables, upon being placed in the runways and supports made for same, shall be neatly sewed or laced in layers, the lacings being at sufficient intervals to hold the whole in a compact and substantial manner.

Hand-Made Cables: These shall be of uniform construction, carefully and neatly laced with strong waxed linen twine and built from tinned copper wire not smaller than 24 B. & S. gauge. The insulation of these conductors shall be similar to that of the machine-made cable, and shall have a similar distinguishing color code.

Hand-made cables shall be further insulated by wrapping with a good quality adhesive tape at such points as may come in contact with the iron framework of the sections. These cables shall be held in place in the switchboard by binding to the framework at frequent intervals with some substantial insulating material, preferably by leather saddles.

Power Wiring: The wiring of the power circuit shall be of the best quality of rubber-covered wire of sufficient size to prevent any appreciable drop in voltage. The current carrying capacity and insulation shall fulfill the requirements of the National Board of Fire Underwriters.

Transmitter battery and ringing generator leads shall be of rubber-covered and braided wire of not less than No. 18 B. & S. gauge.

Each operator's transmitter circuit shall be supplied with current through individual battery leads.

There shall be a main generator lead run through the switchboard sections, from which taps are to be taken for each operator's position. Individual resistances, preferably 110-volt, 16 c. p. incandescent lamps, shall be placed in these generator taps to protect the machines when ringing on crossed or grounded lines.

Jumper Wire: A sufficient amount of jumper wire for making all cross connections on the main and intermediate distributing frames shall be provided and such "jumpering" done as is designated by the telephone company up to the time the switchboard sections are completely installed.

The jumper wire conductors shall be No. 20 B. & S. gauge, tinned copper, rubber covered and braided, the whole being treated so as to be flame proof, Jumper wire shall be twisted together in "*doubles,*" or "*triples,*" as required for the main and intermediate frames, and each conductor shall be dyed with a distinguishing color.

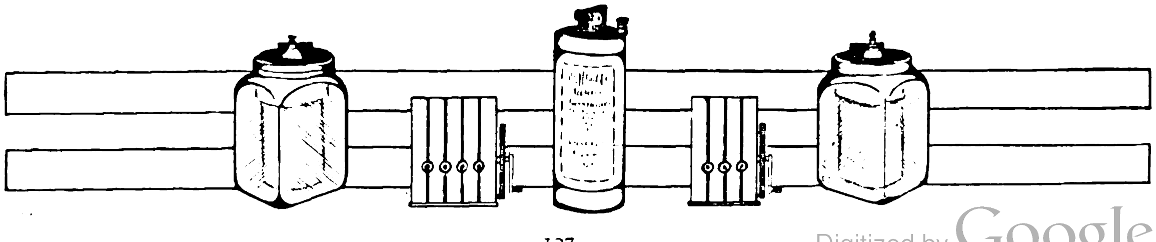
GENERAL CONDITIONS.

All appliances and apparatus specified shall be furnished and all work and labor required to set up and connect this central office equipment complete and ready for operation, whether specifically mentioned or not, shall be done by the contractor in suitable rooms, which shall be provided by the.............Telephone Company, in the city of ...., State of ....

It is understood that the work of the contractor shall consist of that portion of the central office equipment beginning with the switchboard side of the main distributing frame through the entire exchange.

After completion of the work, the contractor shall remove all debris, disposing of it in a manner suitable to the telephone company and the city authorities. The installation shall not be deemed complete until the work called for by this specification is ready for immediate and continued service, all material, circuits and workmanship having been duly approved by the engineers of the telephone company.

Extra Work: No claims for extra work shall be entered unless the same have been done in accordance with a written order of the engineers and countersigned by an officer of the telephone company and a stipulated price agreed upon.



KANSAS CITY COMPANY BUYS ITS EQUIPMENT.

THE Kansas City Home Telephone Company has awarded contracts for all central office equipment for its exchanges in Kansas City, Mo., and Kansas City, Kan., to the Stromberg-Carlson Telephone Manufacturing Company, of Chicago, Ill., and Rochester, N. Y. This is the largest and one of the most important contracts let since the contract for the equipment of the Frontier Telephone Company, of Buffalo, N. Y., was awarded to the Kellogg Switchboard and Supply Company, two years ago. Under the terms of the contracts with the Stromberg-Carlson Company, the main exchange in Kansas City, Mo., is to be in operation on September 20th and the sub-exchanges, October 1, 15 and November 1, 1903.

The Kansas City Home Company has been experimenting with various makes of apparatus for some time past, and the contract was not awarded until most rigid tests had been made.

The contract comprises four exchanges as follows: The main exchange having a capacity for 12,000 lines will be equipped for the immediate operation of 4,500 lines, capacity for 360 trunk lines, present equipment of 120 lines. The east branch exchange will have an ultimate capacity of 7,200 lines, equipped for the immediate operation of 1,200 lines, capacity for 360 trunk lines and a present equipment of 75 lines. The south branch exchange will have a capacity for 7,200 lines and a present equipment of 700 lines, capacity for 360 trunk lines with a present equipment of 75 lines.

The Kansas City, Kansas, exchange will have a capacity for 7,200 lines and will have a present equipment of 800 lines, capacity for 360 trunk lines and a present equipment of 80. All of the above boards are to be of the Bridged Multiple Relay Lamp Signal Central Energy type. The contract calls for the necessary wire chief's, monitor's and chief operator's desks, distributing frames, lightning arresters, power plant, storage batteries and a complete central office equipment.

TOPEKA COMPANY GIVES PRIZES.

By JOHN V. VANDEMARK, *Special Correspondent*

A SUCCESSFUL method of obtaining quick service from operators is being used by the Independent Telephone Company of Topeka, Kans. Some time ago Mr. Pankey, the president of the company, offered a prize of $5 to the operator making the most rapid progress in answering calls within a month; a prize of $3 was offered to the second best and $2 to the third. The tests are made from subscribers' telephones by an inspector, who uses a stop watch in order to tell the actual time consumed by the operator in answering the calls. The operators who are then found to be needlessly slow are dismissed from service. Mr. Pankey found that the plan worked so satisfactorily that he has continued the awarding of prizes, and the girls seem to enter into the contest with a zest and determination to win.

SABIN TIRED OF HIS JOB.

THE board of directors of the Chicago Telephone Company, and the Central Union Telephone Company, at a recent meeting, re-elected John I. Sabin, president of both companies.

Mr. Sabin has announced that he cannot consent to continue in office during the entire year. When he became president of the Chicago Company, Mr. Sabin only undertook to serve two years, and he now says he feels that he must insist on being relieved.

To those who have closely followed the course of events since Mr. Sabin's incumbency, it is evident that he is tired of his job. The affairs of the Central Union Telephone Company have not been in the least improved. On the contrary, they appear to be in even a worse state of chaos. Mr. Sabin has given his best efforts to the task—he has done all he could do.

The real trouble with these Bell properties is to be found on the outside. The stronghold of the Independents is right in the territory in which the Central Union operates. It is clear that the Central Union has been whipped to a standstill, and that this is the real reason for its present very poor condition.

LONG DISTANCE COMPETITION.

LONG distance rate competition between Pittsburg, Pa., and Ohio points is just now very keen. The Bell Company formerly charged $1.50 for five minutes' conversation between Cleveland, Ohio, and Pittsburg. The Pittsburg and Allegheny cut this to 75 cents, when it first opened up communication between these points. This rate was then met by the Bell Company, whereupon the P. & A. Company reduced its rate to 65 cents, at which rate it still has a good margin of profit.

The rates between Pittsburg and other Ohio points are, according to the new schedule of the P. & A. Company, from 10 to 25 per cent. lower than the rates of the Bell Company. The P. & A. Company's lines are also connected with a great many points in Western Pennsylvania and the company expects soon to be connected with Washington, Harrisburg, Altoona and Philadelphia.

This company has what is known as a discount system in use, by means of which holders of rebate certificates are entitled to the following discounts: Long distance bills from $5 to $25 per month, 10 per cent. discount; from $25 to $50 per month, 12½ per cent. discount; from $50 to $75 per month, 15 per cent. discount; from $75 to $100 per month, 20 per cent. discount, everything in excess of $100 per month, 25 per cent. discount.

INDIANA TELEPHONE LEGISLATION.

By H. S. O'BRIEN, *Special Correspondent.*

A TELEPHONE decision by Judge Francis T. Hord, of the Bartholomew County Circuit Court, Columbus, Ind., recently threatened trouble for telephone companies, but the Indiana Legislature has just passed a bill that will head off similar action by courts hereafter. The case was the State of Indiana against the American Telegraph and Telephone Company, which was charged with obstructing the public highway by maintaining poles therein. The prosecuting witness was a road supervisor. Land owners along the highway named were friendly to the defense. The court decided against the company and assessed $100 fine. The decision affected all telephone and telegraph companies.

A bill was promptly introduced in the Legislature to give companies the right to maintain poles in the highways. Before it was properly understood it was defeated by a decisive vote. Then telephone people got in their missionary work and the bill was reintroduced and passed by handsome majorities in both Houses. It provides that telephone companies are authorized to set and maintain their poles, wires and other fixtures along and across any of the public roads, highways and waters of the State, outside of cities and incorporated towns. The bill had an emergency clause to put it into prompt effect. It is to be noted that the bill applies only to telephone companies.

PITTSBURG & ALLEGHENY HAS 40,000 CONNECTIONS.

INCLUDING outside connections, the Pittsburg & Allegheny Telephone Company is now serving about 40,000 subscribers. This takes in also connections which have recently been established with Oil City and Warren, Pa., and Wellsville, O., and other important places.

The company will break ground in McKeesport for the new conduits sometime in April and it is expected that the lines will be in use by August. The new exchange in McKeesport will be located in the building of the National Bank of McKeesport, where at present the temporary exchange is located. In a short time the Pittsburg & Allegheny Company will erect a modern exchange building in the Tube city. It will be one story high with a mezzanine story in front. The equipment of this new building will be most modern and complete and of a permanent character, in keeping with all of the work that the Pittsburg & Allegheny Company is doing.

REPORT ON PETROLEUM TELEPHONE COMPANY.

WILLIAM S. PACA and P. M. Speer, the receivers of the Petroleum Telephone Company, of Oil City, Pa., have made public their report of the condition of the company's property. It is as follows:

"The true explanation of the necessity for the appointment of receivers is the fact that the company has a much larger number of subscribers than was anticipated, thus requiring a greater investment than was expected. It was thought by the original promoters of the company that about twelve hundred subscribers could be obtained, but as a matter of fact, there are now nearly eighteen hundred subscribers connected with the exchanges at Oil City, Franklin, Titusville and Pleasantville, and a great deal of new business is and has been offered which the company has been unable to take care of. It was therefore deemed best for the interests of all creditors and stockholders of the company that the company be placed temporarily in the hands of receivers, pending the completion of plans for reorganization, which will place the company on a sound financial basis."

NEW ENGLAND DEVELOPMENT.

THE New People's Telephone Company of New England, with headquarters at Haverhill, Mass., which was organized under the laws of the State of Maine some two months ago, is about ready to announce its plans to let the people in the telephone world know what it is going to do. The Independent telephone situation in New England is very much undeveloped at the present time. The promoters of this new company are men who have been in the business for the past six years in nearly every instance and they are able to make a very good proposition out of the situation. There ought to be close to one-half million telephones in the New England States. There are to-day only about 120,000. The People's Telephone Company will combine nearly all of the Independent companies, with the exception of the automatic companies, and a toll-line basis will be arranged with the automatic companies. The officers and promoters of the New People's company are the Messrs. Whitman, of Boston, and Mr. N. H. Spofford, of Haverhill.

TELEPHONES IN THE CATTLE COUNTRY.

By J. A. Carr, *Special Correspondent.*

THE use of the telephone is becoming more extensive each year among farmers and residents of rural districts. Especially is this true throughout the central and western part of the State of Kansas. Many farmers' lines are being built in the more thickly settled regions. In the extreme western part of the State where every attention is paid to the cattle industry, the ranchman builds his own line, connecting his ranch with that of his neighbor, who may be some twenty miles away. This system is continued, until a ranch near a country town is reached. A line is then built into the town, placing the isolated dwellers of the ranches in connection with the merchants, doctors, post-office, etc., of the place with which their business is transacted.

Where cattle ranches cover as many as a hundred sections, the distance from the nearest town or neighbor is naturally very great, and the cost of building pole lines covering this distance is almost out of the question. As all ranches are tightly enclosed with barbed wire fences, and these form a continuous circuit for miles and miles, the barbed wire has become to be used almost universally to carry the current of these rural lines. The top wire of the fence is insulated by means of small porcelain knobs, and connections made at corners and gates by running the wire on high poles to place it out of danger. Only one wire is used, which is grounded at each end of the line. The regular bridging telephone is used, and it is surprising to one not acquainted with this system how perfectly it works and how plainly messages can be transmitted over a long distance.

TO PROHIBIT RATE DISCRIMINATION.

RICHARD VALENTINE, president of the Wisconsin Telephone Association, has had introduced in the Wisconsin State Legislature a bill to prohibit discrimination in the charges of telephone rentals in different cities and villages in the State.

The bill provides essentially that telephone companies in one city or town shall not charge more or less for service than is the rule in other cities or towns of like size.

For the purpose of basing a charge, the cities are classified as follows: Cities of the first class, those above 100,000 population; cities of the second class, 75,000 to 100,000 population; cities of the third class, 50,000 to 75,000 population; cities of the fourth class, 40,000 to 50,000 population; cities of the fifth class, 30,000 to 40,000 population; cities of the sixth class, 20,000 to 30,000 population; cities of the seventh class, 15,000 to 20,000 population; cities of the eighth class, 10,000 to 15,000 population; cities of the ninth class, 7,000 to 10,000 population; cities of the tenth class, 5,000 to 7,000 population; cities of the eleventh class, 3,000 to 5,000 population; cities of the twelfth class, 2,000 to 3,000 population; cities of the thirteenth class, all under 2,000 population.

A penalty of not less than $50 or more than $500 is provided for violations, one-half of which is to be paid to the person bringing suit.

INTERCONNECTING OF RIVAL LINES.

REPRESENTATIVE CAMPSEY has introduced a bill in the Pennsylvania State Legislature requiring rival telephone companies to make connections with their systems and transmit messages, originating in one, over the lines of the other at the ordinary rates. The Pittsburg *Gazette*, in speaking of the bill, says that there is nothing but common carrier justice in the bill; that telegraph companies are required to do just what is provided in this bill. In fact, all of these companies enjoy a grant from the people of eminent domain in consideration of service for the accommodation of the public. They have no right to refuse that service, says the *Gazette*, to any individual to the extent of their ability to render it. If there is any doubt of the efficacy of existing laws to secure such service it should be removed by the prompt adoption of the Campsey bill.

A TELEPHONE BAND CONCERT.

PERHAPS the most novel musical event on record was the telephone band concert attended by all Hawaii a few weeks ago, says the New York *Tribune*. The Territorial Band, formerly the famous Royal Hawaiian Band, leader Captain Berger, went to Hilo on its annual visit. The band ordinarily is stationed at Honolulu, and was to return there in a week. The Hawaiians were wild over the music, and requests for the band poured in from all over the island. A joking remark of an acquaintance about "playing into a phonograph" gave Captain Berger the idea of the telephone concert. The telephone company gave enthusiastic co-operation, getting their instruments in shape, notifying subscribers, etc., and from 2 to 4 o'clock of a Sunday afternoon business communication was suspended through all its exchanges. Fully eight hundred telephones were included in the system. The band played in the city of Hilo, a gigantic trumpet receiver connecting with a special switchboard being placed close to the performers. The arrangement worked perfectly, and not a complaint was received. The concert was literally heard all over the island.

Opinion and Comment

TO PUT AN END TO FOUL FIGHTING.

The Southwest Telephone and Electric Company,
Marion, Kansas, Dec. 7, 1902.

Editor The American Telephone Journal.

Dear Sir: I have a matter that I wish to take up with you, and that is the article entitled "Profitable Telephone Rates," in the November number of *Telephony*, by Fred De Land. If you have not done so, I wish you would read that article over carefully, compare the tables which he gives (and the source of those tables) as showing the actual cost of furnishing the service, "not including interest, appropriations for sinking fund, contingent liabilities or dividends," as stated on page 203. Read the two lower paragraphs in the left-hand column of that page.

How does that read for an Independent publication? Imagine yourself a prospective Independent telephone investor, read the article, compare the tables, and say whether you would invest or not, the deductions of the article being accepted as true.

According to that article, every Independent plant in the United States is being operated at a loss. Ostensibly the article is a protest against unremunerative rates—really it is a deterrant to investors in Independent securities.

Yours truly,
CHAS. E. WELLS, President.

This letter, as shown by the date line, was received by the Editor of THE AMERICAN TELEPHONE JOURNAL over three months ago. A number of others bearing on the same subject have been received since, all from men who, like Mr. Wells, are officers and managers of Independent telephone companies. We have put off action on these letters from time to time, because it was our hope that the paper serving Mr. De Land as a vehicle for his misstatements would close its columns to him and thereby shut him off. But we have finally concluded that this is too much to expect. The March issue of this paper contains the same class of matter from Mr. De Land's pen that was complained of in the November issue, and the intervening issues without exception, have teemed with the same sort of stuff. As it is apparently the intention of Mr. De Land and the paper to continue this sort of work, we deem it necessary, unpleasant as the task is, to put an end to this foul fighting by cataloguing Mr. De Land and doing it as thoroughly as possible. To help along the work, we are printing on the opposite page, a circular letter issued last May by the Kansas Independent Telephone Association. A copy of this letter was sent to the telephone paper complained of by Mr. Wells. It was also sent to every other person who might be misled into accepting Mr. De Land as an Independent operator, but apparently it has had no effect in checking that gentleman's effrontery. He continues to parade himself as a friend of the Independent cause, and to provide "advice" and "counsel" in print. This "advice" and "counsel" is then carefully paraded by the people who employ Mr. De Land, as "confessions of the true Independent situation by one of the foremost Independents, Mr. Fred De Land, of the Federal Telephone Company, Pittsburg, and of the Kansas Long Distance Telephone and Telegraph Company of Topeka."

It would be an endless task and a useless one to analyze De-Land's statements at length. He publishes them in various guises, sometimes as signed articles, sometimes as editorials in the paper complained of by Mr. Wells and sometimes, as in the March issue of that paper, as "Answers to Correspondents," both the "query" and the "answer" being written by Mr. De Land. In any guise his handiwork is stamped so clearly that even the most inexpert can pick it out, as it happens fortunately, that this "Representative Independent" is not at all clever with his pen, so that he cannot change his crude style of expression with the same facility that he changes his position from contributor to editorial writer and from editorial writer to "Zenith," as he signs himself in his "Comunication," to the March issue of the journal that prints his veiled attacks on the Independent cause.

Nor is Mr. De Land any more expert in handling his alleged "facts" than he is in handling his English. His articles, whatever form they take, are made up of crude falsehoods whenever he "presents the real condition of the Independents," and of equally crude inflations when he goes into the "question of Bell earnings."

The following extract from the latest effusion prepared by this "distinguished Independent," the one printed in the March issue of *Telephony*, serves as a fair example of the man's mendacity.

> That is, on an average investment 43 per cent. less than the six Independents claim, the Bell derives an average income per subscriber 102 per cent. greater. And on an average investment 23 per cent. greater than that reported by the ten Independent companies the Bell derives an income 263 per cent. greater. This shows why the Bell is able to "include deferred or contingent maintenance and fund to cover depreciation and eventual reconstruction" in gross earnings, and also why the Independents fail to include it.

These deductions, purely fictitious so far as general averages are concerned, show, or should show, even to the most stupid, that Mr. De Land is as much entitled to be ranked an Independent as any of the other gentlemen whom the Bell employs to fight modern telephone growth by bush methods. The president of the American Bell Telephone is lukewarm compared to Mr. De Land when it comes to showing the dividend earning powers, present and future, of the Bell parent and licensee companies. Mr. Fish, is compelled, by virtue of his office, to at least touch in his annual reports, on such little incidents as the smash-up of the Central Union (the Bell company, of Iowa, Illinois, Ohio and Indiana); the wreck of the Erie company, which ruined thousands of trusting investors, who were deluded by the "gilt-edge character of all Bell securities," as it has been modestly put, and the fate of the Michigan Bell Telephone Company, which has just sunk peacefully to rest in the arms of a receiver. Not so Mr. De Land. He calmly ignores all such trivial items as these in his confidential talks to "My fellow Independents." He ignores also the fact that not a single important Independent company, with the exception of the Cuyahoga, of Cleveland, has gotten into anything like the condition of the "Great Bell Companies," enumerated above. He carefully avoids showing that with over 5,000 Independent companies, large and small, operating in the field, there have been fewer failures among them, year for year, than among the national banks of the country, and national bank stocks are concededly the best investments in America.

The reason why Mr. De Land ignores these facts is very plain and we will state simply. He is a henchman for the Bell company. Fortunately he is a clumsy henchman, and so far as his "literary" work is concerned, the Boston company could do very much better by drawing on any experienced newspaper reporter who would lend himself to such work. But he probably averages up by doing in addition, the sort of nasty work outlined in the Kansas circular letter on the opposite page.

KANSAS TELEPHONE ASSOCIATION ON DE LAND

THE following circular letter was issued by the Executive Committee of the Kansas Independent Telephone Association, after a thorough investigation of the record of Fred De Land, whose persistent attacks on Independent telephone securities may have had some effect, because he masquerades as an honest Independent operator:

MARION, Kan., May 1, 1902.

AS most of you are aware, Mr. Fred De Land, recently of the Federal Telephone Company, of Pittsburg, Pa. (not the Ohio Federal Company,) has organized the Kansas Long Distance Telephone & Telegraph Company, with headquarters at Topeka, with the expressed intention of building long distance lines in this State, and connecting the local Independent companies. As most of you are also aware, this gentleman was openly charged at the Topeka convention with being an emissary of the Bell company.

Since that time the officers of the association have been securing information in regard to the past record of the gentleman in question. It was found necessary for a representative of the association to visit Pittsburg and vicinity, where the Federal Company has been operating for the past three years, in order to secure the facts and details.

In order that members of the association may form their own opinions as to his connections and probable intentions, it will be necessary that we give a brief synopsis of his history, so far as it relates to the Independent telephone movement.

Our first knowledge of him began with his publication of the magazine known (as we now recall it) as the *Electrical Engineering Magazine*, which was evidently published in the interest of the Bell Telephone Company, as its columns contained much information in regard to the growth and extensions of that concern, and also numerous articles by De Land, bitterly attacking the Independent movement. Mr. De Land, in conversation with the writer at Topeka during the recent convention, gave as his reason for having written those venomous articles upon the Independent situation, the statement that at that time he was hopelessly in debt on his magazine, owing some $10,000, and that by publishing these "skits," as he now lightly terms them, he was enabled to sell his issues (to whom he did not say) at prices which enabled him to pay off the most of his indebtedness. He further stated that after he had paid off all but a few hundred dollars, he turned the publication over to Mr. Kammeyer, simply in consideration that Kammeyer assume the remainder of the indebtedness. Mr. Kammeyer at once changed the name and policy of the magazine, and has since been making a very creditable journal of it under the name of the *Telephone Magazine*.

Our next knowledge of Mr. De Land as a fixture in any certain locality, is his appearance some months later, at Pittsburg, Pa., in the latter part of 1898, when he organized the Federal Telephone Co., claiming to be backed by Chicago and New York capitalists with unlimited means. He proceeded to buy Independent plants and secure franchises in all the towns and boroughs surrounding Pittsburg. A number of well posted telephone men have remarked upon this sudden change in his financial status—thinking it rather remarkable that a man who but a short time before had made a financial failure of the publishing business, should be able to secure apparently unlimited capital with which to enter the telephone field. This, too, at a time when it was no easy matter for the average Independent company to enlist capital sufficient to develop good plants.

His company was organized and commenced operations in the vicinity of Pittsburg shortly after the Pittsburg and Allegheny Telephone Company had secured its franchises in those cities, and its construction had become an assured fact.

It is perhaps worthy of notice in passing, that the organization of his Kansas Long Distance Company, dates relatively to the successful promotion and organization of the Kansas City Telephone Company. In the spring of 1899 his company purchased the Independent local plant at Carnegie, Pa., 8 miles out of Pittsburg, promising its stockholders and subscribers connection with Pittsburg and Allegheny through the lines of the P. & A. Company, then building. The former president of the local Carnegie company, informed the writer that at that time the local company was operating two hundred telephones, while the Central District and Printing Company, (the Bell licensees in that district) had but eleven in Carnegie. The Federal company has allowed the exchange to decrease to less than 100 telephones, and the same gentleman gives it as his opinion that few, if any, of them are paying for the service. These losses have gone to the Bell company, who have in the meantime increased their exchange to over 100 telephones. The P. & A. company have only recently succeeded in gaining entrance to the town, owing to the objection on the part of the city to having three sets of poles in the streets. They are now, however, putting up splendid construction and are rapidly securing subscribers. The condition of the Federal pole lines in Carnegie can best be described as "on the bum," apparently nothing having been done to keep them up.

The gentleman above quoted is of the opinion that had they not sold to De Land, they could now have been operating a local exchange of over 500 telephones in connection with the P. & A., and to the practical exclusion of the Bell.

The conditions existing in Carnegie are true to a greater or less extent in all the towns in which the Federal secured holdings, while in Braddock and Homestead, where the officers of the local companies were suspicious, and declined to sell out to him, the situation is radically different.

Braddock has the finest Independent exchange that the writer has ever seen, a multiple board of 3,000 capacity, with 650 connected, while the Bell have 125 telephones in the same territory. At Homestead there is a fine Independent plant of 424 telephones, as against 78 Bell. At McKeesport, a city of some 35,000 people, six miles south of Braddock, the Federal purchased the local exchange of 1,000 telephones in 1899. The writer did not visit this plant, but is informed by responsible people that the conditions existing there are the same as at Carnegie, that the exchange is dying of neglect, and the business going to the Bell people, while the P. & A. company has as yet no connection with the city. What a handicap this is to the P. & A. company, is apparent to any telephone man.

The statements of the Independent people in that vicinity convince the writer that the condition of all the Federal properties is similar to that at Carnegie, and that the revenue in the majority of its plants at least, is not paying its operating expenses. If this be true, the money put into these plants (estimated at over half a million) is practically a total loss, considered as an investment.

Yet Mr. De Land states that his backers have decided to put up $625,000 more to "invest" in the Independent field in Kansas. Inasmuch as the Bell people are the only apparent gainers by the expenditure of this money in the Pittsburg field, it is rather difficult to comprehend how a man whose operations are "legitimately Independent of the Bell" can continue to secure financial support.

Mr. Sidney H. Browne, vice-president and general manager of the Pittsburg and Allegheny Company, sums the matter up in these words, "I earnestly hope that man will not get a foothold in your territory, he will make you all kinds of trouble. He has snarled up the telephone situation here in a way to distress and hamper us terribly. We have licked him here, because no one would connect with him, and you can do the same if you stick together."

Every possible effort has been made by the Independent people there to learn the identity of his backers, but without success.

One thing seems evident, and that is, that he is "stalking big game." Pittsburg is the heart and center of the territory of the Central District and Printing Company, just as Kansas City is of the Missouri and Kansas Telephone Company.

Mr. De Land's new company has recently asked the city council of Topeka for entrance for its lines, independent of and in opposition to the wishes of Mr. Pankey, who has built a splendid Independent exchange there, and recently refused to sell a half interest therein to De Land.

A word to the wise is sufficient. Owners of Independent properties who have any regard for the welfare of their neighbors and connecting lines, their subscribers interests and their own good name in the Independent field, should investigate carefully before selling properties or making contracts that may work a hardship to the entire Independent interest.

THE KANSAS INDEPENDENT TELEPHONE ASSOCIATION.
A. R. Champlin, C. L. Brown, W. H. Nelson,
E. H. Berry, J. E. Byers,
EXECUTIVE COMMITTEE.

Patents

TELEPHONE SYSTEM AND LOCK-OUT PARTY LINE SYSTEM.

J. W. Lattig and Charles L. Goodrum, of Philadelphia, patent (Nos. 722,367 and 722,362) a telephone system and lock-out party line telephone system.

The object of 722,367 is to provide an improved form of common battery switchboard circuit, in which a two-wire cord is used, the cut-out relay omitted and the supervisory signals improved and rendered more simple and more reliable by the use of a polarized relay. The inventors also arrange the common battery in two parts and thus increasing battery power and remove the ground from this part of the circuit. This circuit is shown in Fig. 1, and may be best understood by describing its operation. *A* and *B* are sub-stations. Suppose *A* wishes to make a call, he removes the receiver *R* from the hook *H*. This closes the circuit through the sub-station set, and completes the battery circuit from the office as follows: Bus bar *39*, wire *27*, impedance coil *8*, wire *28*, line wire *1*, sub-station set *R*, *T*, *H*, line wire *2*, wire *15*, line relay *9*, impedance coil *7* wire *30* to bus bar *38* and the other side of the battery. This energizes the relay *9*, which attracts armature *24*, closes the calling lamp contact *25* and lights the calling lamp through the following circuit: Bus bar *39*, wire *26*, contact *25*, armature *24*, wire *16*, lamp *10*, wire *17*, bus bar *38* to battery. The operator responds by inserting the answering plug *M*, which produces three results. First, the cord conductors are connected to the calling subscriber's line through the jack springs *3* and *4*. Second, as the sleeve of the calling plug *M* is solid, jack spring *4* and jack ring *6* are short circuited. This shunts the relay *9*, the armature drops back and the calling lamp is extinguished. Third, the supervisory relay *R* is brought into play through the following circuit: Wire *22*, conductor *23*, plug sleeve *21*, jack sleeve *6*, jack spring *5*, wire *29*, impedance coil *7*, wire *30*, bus bar *38* to positive pole of 6-volt battery, thence through battery to the negative pole, wire *34* to the relay coils. The 6-volt battery, if unopposed in any manner, would be sufficient to energize the relay coils and pull the armature *36* against contact *31*, lighting the supervisory lamps *12* through the following circuit. Positive pole of 40-volt battery *B* through wire *35* to relay armature *36* to contact *37*, through lamp *12*, wire *33* to bus bar *38* and to negative pole battery. If the receiver at the sub-station is off the hook the illumination of the supervisory lamp is prevented by an opposing current that flows through the following circuit: Bus bar *39*, wire *27*, impedance coil *8*, wire *28*, line wire *1*, sub-station *R*, *T*, *H*, line wire *2*, jack spring *4*, sleeve of plug *21*, wire *23*, wire *22* supervisory relay coils *R*, wire *34* to bus bar *340* to negative pole of 34-volt battery *B*, thus, so long as the receiver is off the hook the supervisory lamps are extinguished, but on replacement the supervisory signal circuit previously described, comes into play, and the lamp lights. The operator tests in the usual manner by touching the tip *20* of the calling plug M^1 to the rings of the jack *s*. Lines that are disengaged emit no click, while the other lines give the usual busy test. Supply of current for talking is furnished to the subscriber's lines not through the cord circuit, as is usually customary, but through the impedance coil *7* and *8*.

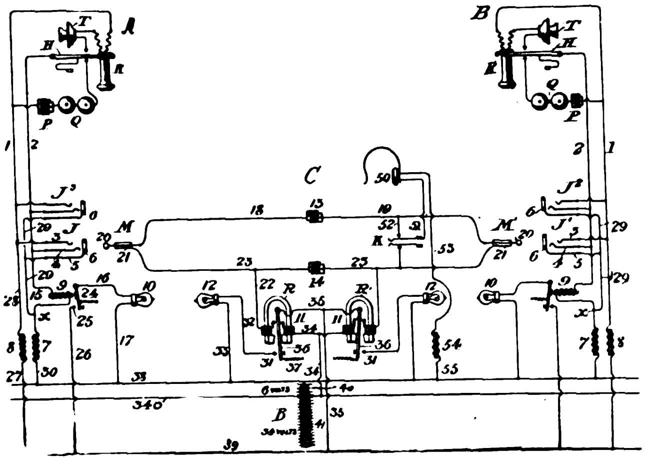


FIG. 1.

No. 722,362 covers a lock-out party line system that is intended to work in conjunction with the previously described switchboard circuit. This system is shown in Fig. 2, and as the switchboard has already been described, it is unnecessary to do more than to explain the operation of the sub-stations.

In Fig. 1 *B*, *C* and *D* are three sub-stations. Suppose *B* wishes to make a call, he removes the receiver T^1 from hook, switch *S* rises and during its motion closes the springs S^4 and S^6, completing the following circuit: From ground at the central office to the intermediate point of the main battery *M*, from the positive terminal thereof through conductor *7*, impedance coil *h*, and conductor *8* to line wire *2*, by wire *17* and wire *28* to springs S^4 and S^6, by wire *27* to magnet *O*, and by wires *26* and *25* to ground. Current flowing over this circuit with an electromotive force of ten volts is of the proper direction and of sufficient strength to energize the magnet *O*, so as to throw over its armature *o* against the spring o^4, the arm o^1 being thereby moved to the right, carrying the dog o^2 out of the path of the shoulder S^3 on the hook-lever *S*, and permitting the latter to rise to its fullest extent, so that at the end of its progress the arms s^3 will force the spring s^2 against its contact-points to close the talking circuit in bridge across the line wires. The moment the talking set has been bridged the polarity of line wire *2* is changed, and instead of having a potential difference from the earth of + 10 volts it now has a potential difference of — 10. This is because a path has been closed from the ground at central through the twenty-volt side of the main battery and from the negative terminal thereof through conductor *6* to line wire *1*, and thence by wires *18*, *22*, *21*, *20*, *19* and *17* to line wire *2*. The primary potential difference by the first path being + 10 and the secondary potential difference being — 20, the resultant is their algebraic sum, or — 10. Thus from the instant a subscriber calls, the line being previously idle, there is a reversal of conditions without any special act of either subscriber or operator. If after the subscriber *B* has called and during conversation either of the subscribers *C* or *D* desire to use the line, and attempt to call, and their switch-hooks will rise far enough to close the contacts s^6, but can rise no farther, for the reason that when the circuit of the magnet *O* is thus completed in each case the polarity of the current flowing therein will be such as to maintain the armature in its biased position, keeping the dog o^2 in its locking position over the shoulder s^3. In rising to this position each switch-hook will display the word "*Busy*" through the opening n^2 in the face of the containing-case.

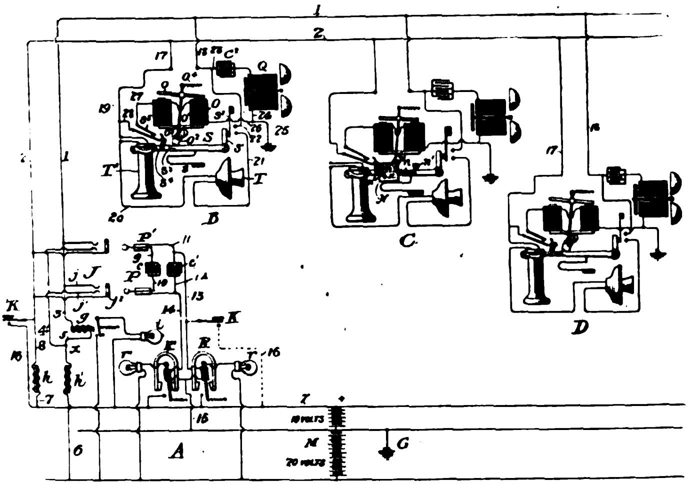


FIG. 2.

LIGHTNING ARRESTER.

William J. Chapman, of Minneapolis, Minn., patents (No. 721,939), a lightning arrester. The object of this invention is to provide a lightning arrester for open wire lines to afford protection from lightning and high potential discharges. This invention is shown in Figs. 1 and 2. Fig. 2 is a cross section of the lightning arrester itself, from which it is seen to consist of a water proof box or case, preferably made of cast iron or some similar metal. In this box there are three carbon plates *f*, *f*, and *c*. One of these plates is grounded, while the other two are attached one to each side of the line. Fig. 1 shows the application of the lightning arrester to the line. The box, or case, *a* is placed upon the cross arm and the carbon plates *f* and *f* connected, respectively to the line wires. In case the line is struck by lightning the discharge passes between the carbon plates *f* and *c*, which form a small spark gap to ground.

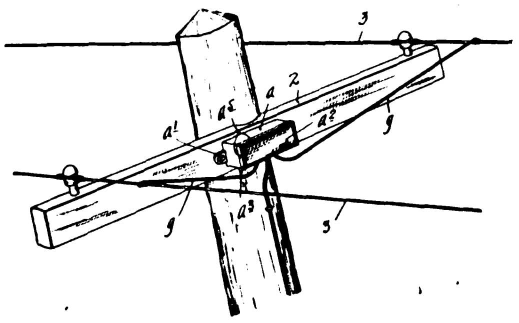


FIG. 1.

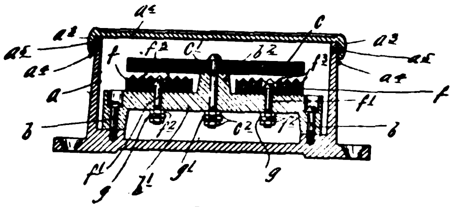


FIG. 2.

IMPROVED RELAY.

William W. Dean, of Chicago, patents (No. 722,680) and assigns to the Western Electric Company, a relay. The object of this patent is to produce an improved relay to be used upon party lines or selective signal. This device is a relay so arranged as to make secure contact at its switch points, when operated by an alternating or pulsating current. It is particularly designed for use on the four-party selective signal circuit. The general arrangement of the circuit containing the relay is shown in Fig. 1. The detail construction of relays is shown in Fig. 2. The inventor secures his object by making the armature in the relay large and heavy and pivoting it so that it swings through a small arc. The inertia of the armature is so great that it will not quiver or vibrate under a pulsating current.

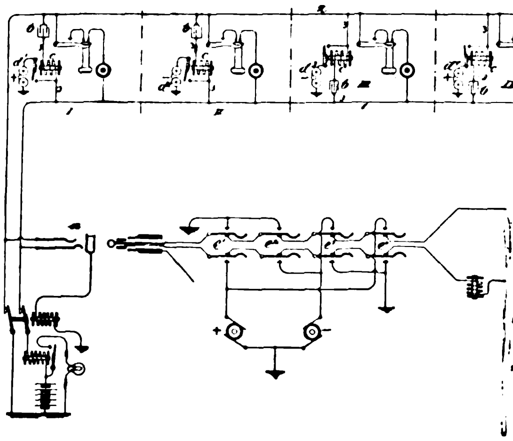


FIG. 1.

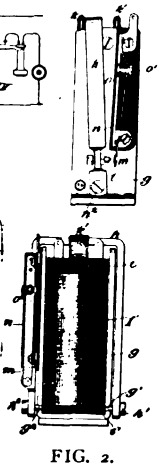


FIG. 2.

VITRIFIED CLAY CONDUIT.

O. C. Pixley, of Chicago, patents (No. 722,249) a hollow tile or brick. This device is shown in Fig. 1. Its object is to produce an improved form of vitrified clay conduit. The particular feature in the invention consists in the formation of a series of grooves, one upon each side, of each piece of duct material, as shown at *A*², Fig. 1. These grooves may be of any shape, though preferably rectangular. They give the opportunity for the insertion of four dowel pins, as shown in Fig. 2 and in Fig. 3. By means of these dowel pins the respective length of conduit can be accurately centered and carefully aligned.

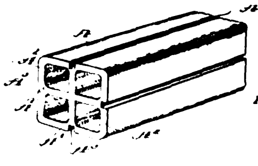


FIG. 1.

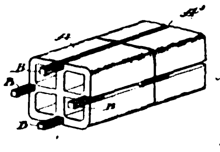


FIG. 2.

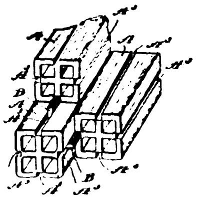


FIG. 3.

Queries

Conducted By WILLIAM W. DEAN

1.—Give best methods for removing binding posts from old style receivers.

2.—What is the best time to cut chestnut for telephone poles; should they be allowed to season before peeling to prevent cracking?

3.—If I connect a long series grounded line by a repeating coil to a short metallic line, can the telephones on the grounded line ring off central through the repeating coil?

4.—If more than one series telephone is connected to a single line wire, the same as bridging telephones on the grounded plan, could central ring any telephones beyond the first one?

5.—Where a long series grounded line parallels a short grounded line on the same cross arms, would there be sufficient leakage from the long to the short line to interfere with the long line ringing central? T. F. C.

1.—There is no good way to do this work. The best way is to buy new receivers without binding posts.

2.—Mr. John F. Tarbold, Supt. of the Consolidated Telephone Companies of Pennsylvania, who is one of the most experienced construction men in the country, in answer to this question, says: "The proper time to cut chestnut is when the sap is up. Use only second growth timber. The poles can be peeled at once and used after they are peeled. Paint is the only thing to keep poles from cracking."

3.—Yes. In buying a repeating coil for this work you should specify to the manufacturer that it is to be used for ringing through, as a coil which is designed especially for talking purposes is extremely inefficient for ringing.

4.—Yes, by adjusting the bells carefully, about half a dozen telephones can be worked in this manner, satisfactorily.

5.—If your lines are insulated in the ordinary manner with glass insulators or porcelain knobs, leakage from one line to the other would have absolutely no effect on the ringing.

Editor THE AMERICAN TELEPHONE JOURNAL:

In your queries in the February 28 number, you advise J. W. M. to use regular conduit for underground cable, and the advice is no doubt good if he can afford to follow it. Cable, however, can be laid underground in the following manner, which is inexpensive, and from four years' experience we find it very satisfactory. We have laid several thousand feet in this manner. We take common pine boards, make a box two inches square inside measure for anything up to 75-pair cable (Roebling) larger in proportion for larger cable. Put in the cable and fill the box with pitch, heated until it runs readily. We have never had a particle of trouble with cable laid in this manner.

G. P. SCHLOSSER,
Gibson City, Ill. The Gibson Telephone Exchange.

The Week's Messages.

NEW COMPANIES

LEXA, ARK.—The telephone line running westward from Lexa has been incorporated. A line from Hopkins & Bradley's store, nine miles northwest of Lexa, will be run to Helena, a distance of twenty-two miles, and will connect with all the principal farmers in that end of the county.

KINGLAKE, ONT., CAN.—A meeting of residents of this vicinity was held at Fairground recently at which the Houghton & Tillsonburg Rural Telephone Company was organized; C. B. Matthews, president; Alvin Griffin, vice-president; A. D. Osborne, secretary; Albert Chute, Edward Francis, John Clark, Eber Gale, M. S. Williams and Albert Swinn, directors.

MERIDEN, CONN.—The Connecticut Telephone and Electric Company, of Meriden, has been incorporated with a capital stock of $36,000. The company will manufacture and deal in telephones and electrical supplies. The incorporators, all residents of Meriden, are Burton L. Lawton, Ernest A. Wilcox, Louis E. Wilcox, William F. Rogers and Burton C. Rogers.

AUGUSTA, ILL.—The Augusta Mutual Telephone Company has been incorporated. Capital stock, $2,000. Incorporators—George Catlin, William S. Beard and Benjamin B. Crain.

EDEN, IND.—The Farmers' Accommodation Telephone Company has been incorporated with a capital stock of $85. The incorporators are S. D. Jackson, M. L. Frank and E. R. Walker.

SCHOOL HOUSE NO. 12, FLORIDA TOWNSHIP, PARK COUNTY, IND.—The Citizens' Mutual Telephone Company has been incorporated with a capital stock of $500. The incorporators are G. L. Laney, John R. Newton and William Shadley.

LUANA, IOWA.—The Luana & Monana Farmers' Telephone Company, of Clayton county, has been incorporated with a capital stock of $2,500.

NICHOLS, IOWA.—A telephone company has been organized near Nichols under the name of the Brown-Heibing Company. Henry Heibing is president and John Hooley is secretary and treasurer.

McPHERSON, KAN.—Joshua Lawrence, who lives south of this place, nine miles, has organized a company of farmers and will build a line connecting all the farm dwellings south of McPherson between Inman and Mound Ridge. There is a move on foot also to organize another company to put in telephones in the north part of the county.

ROME, KAN.—W. Lants, H. F. Harbaugh and J. Coffeen, of this place, have organized a telephone company. They have asked for a franchise to install an exchange at Wellington. It is their intention to build a line from South Haven to Wellington. A franchise has been granted by the South Haven city council for an exchange.

CAMDEN, MICH.—A co-operative telephone company has been organized at Camden, the system to cover the entire township. It is capitalized at $10,000, with shares of $25 each.

CAPAC, MICH.—The articles of association of the Capac Telephone and Messenger Company have been filed with the county clerk. The company has $15,000 capital. Among the stockholders are E. J. Buck, J. L. Willoughby, R. Morrison, W. H. Sturgis, C. E. Zilke, Sherman Sharrard, Mary E. Sturgis and H. P. Stoughton.

VANTOWN, MICH.—Articles of incorporation have been filed with the Secretary of State for the Vantown & Mason Mutual Telephone Company, of Wheatfield Township, with a capital stock of $2,000.

CHOTEAU, MONT.—The Montana Telephone Company has been organized here, and will be incorporated for the purpose of constructing and operating telephone lines in this county. The incorporators and first board of directors are: F. D. Kingsbury, of Dupuyer; C. R. Scoffin, of Pondera; Joseph C. McQuaid, of Pondera, and C. F. Drake, of Choteau, the latter being the treasurer and manager. The capital stock is to be $2,400. The company owns the Choteau-Collins line, which will soon be completed. The present plans contemplate lines between Choteau and Bynum, Dupuyer and Conrad and Conrad and Shelby. The material for the last-mentioned line has already been ordered, and it is expected to have it completed by April 15. These new lines will furnish communication with Great Falls and other important places in the State.

MISSOULA, MONT.—Farmers of the Bitter Root Valley have decided to install a local telephone exchange connecting all the important towns with the fruit farms. This will afford communication with Missoula and other towns in the State. Exchanges will be installed at Lolo, Florence, Stevensville, Victor and Hamilton, with wires running to different ranches.

OMAHA, NEB.—The agitation in favor of the Independent telephone companies has resulted in the movement to organize another local company. Attorney James E. Price is said to be the moving spirit in the organization of the company, and is said to have several Des Moines men interested with him in the project. It is understood that the company when formed will seek a franchise in Council Bluffs. The Independent company, organized by H. H. Van Brunt, Attorney Emmet Tinley and other business men, of this city, is also planning to go before the city council again with a proposition for a franchise.

JERSEY CITY, N. J.—The Southern Telephone Construction Company, registered office 15 Exchange Place, has been incorporated, capital stock $50,000; will start with $8,000 stock paid up. Incorporators—Frank Hart, C. H. Lemmon, C. Bond Lloyd, Isaac N. Humphrey and Clarence Brown.

TRENTON, N. J.—The Illinois & Indiana Telephone and Telegraph Company has been incorporated at Trenton with a capital stock of $2,000,000, to carry on a general telephone and telegraph business. The incorporators are Louis B. Dailey, Joseph M. Mitchell and Kenneth K. McLaren, all of 15 Exchange place, Jersey City, the registered office of the company.

FREEPORT, L. I., N. Y.—The New York and Long Island Telephone Company (to operate in Kings, Queens, Nassau and Suffolk counties) has been incorporated, capital $100,000. Directors—W. H. Bennett, G. L. Deneo and B. P. Tabbot, New York. This company is the successor to the South Shore Telephone Company.

MILLERS MILLS, N. Y.—At a telephone meeting held at the store of Getman & Miller recently the following officers were elected: W. D. Gorsline, president; Orren Getman, vice-president; J. H. House, secretary; N. J. Harter, treasurer, and M. M. Gay, superintendent. George Hughes, A. Finge and Isaac Casler were appointed finance committee. The proposed line will run from this place to Columbia Center, and perhaps to Mohawk by way of Dennison Corners.

NORWOOD, N. Y.—The Norwood Telephone Company, of Norwood, St. Lawrence County, has been organized with a capital stock of $25,000. Directors: W. J. Fletcher, F. L. Smith and A. C. Healey, of Norwood.

OLIN, N. C.—A new telephone company, to be known as the Rocky Creek Telephone Company, has been organized in Olin. Stockholders: L. C. Myers, J. R. Huie, N. T. Summers, T. L. Jennings, W. L. Hollard, C. A. Tomlin, N. D. Tomlin, R. B. Reid.

RALEIGH, N. C.—A charter has been granted to the International Telephone Company, with headquarters at Spray, Rockingham county, capital authorized $125,000, N. G. Wilson and others stockholders. The charter confers very extensive privileges to operate telephone and telegraph lines, electric railways, electric light and power plant, to manufacture and deal in any kind of electrical machinery and also to own and operate factories of any kind.

ATTICA, OHIO.—The Farmers' Mutual Telephone Company of Attica has been incorporated by J. W. Walker, A. L. Sourwine, D. E. Schaff, A. W. Knight, W. Schaff, capital $3,000.

CLINTON, OHIO.—The Clinton Telephone Company has been incorporated, capital $50,000.

WILLSHIRE, OHIO.—The Willshire Telephone Company has been incorporated by J. D. Johnson, P. W. Deitsch, A. Beall, Levi Young, Fred Young, capital $20,000.

NEW BEDFORD, PA.—The stockholders of the New Bedford-Fulton Telephone Company have organized by electing the following officers: Dr. H. W. Bender, president; Dr. J. G. Hanks, vice-president; Thomas A. Jones, treasurer, and C. G. Masters, secretary. Directors: Dr. H. W. Bender, Dr. J. G. Hanks, Thomas A. Jones, C. G. Masters, H. Frank Gump, W. W. McDaniel, Nathan B. Hanks, E. N. Palmer and John Hershberger. The company has a capital of $5,000 and has applied for a charter. It will build a line to take in the towns of Clearville, Robinsonville, Mattie, Gapsville, Crystal Springs, Emmaville, Akersville, Rays Hill, Graceville and Wells Tannery At the

THE WEEK'S MESSAGES—Continued.

latter place it will connect with the Satillo Telephone Company, which covers a part of Fulton and Huntington counties. It is also expected to have a line connecting with Bedford.

ENOREE, S. C.—The Enoree Bell Telephone Company has been incorporated with a capital stock of $625. Incorporators: F. Engle, J. W. Allen, M. C. Poole. The headquarters of this company were stated in a recent issue as being in Spartanburg, Ga.

CONDE, S. DAK.—The Spink County Mutual Telephone Company, of Conde, has been incorporated, capital $100,000.

EGAN, S. DAK.—A movement has been begun to organize a farmers' telephone company. N. H. Maupin, proprietor of the local system, is at the head and is meeting with success. The company will be incorporated with a capital stock of $10,000.

GAYVILLE, S. DAK.—Another telephone company has been organized in Gayville. It will be known as the West Side Telephone Company and will extend seven miles south and west of town. President, George McCone; secretary, J. O. Aseth.

HECLA, S. DAK.—At a meeting held here the work of organizing a local telephone company was completed. The object of the organization is to construct a local telephone system and extend branch lines to points in the country.

SCHLEISINGERVILLE, WIS.—The Cedar Lake Telephone Company, of Schlesingerville, has been incorporated, capital stock $2,000; incorporators, John Rosenheimer, Jr., and Mrs. Rosenheimer.

WATTERSTOWN, WIS.—A new telephone company has been organized here, known as the Oak Ridge Telephone Company; Frank Pospipal, president; W. H. Lee, secretary, and James Reid, general manager.

FINANCIAL.

COLLINSVILLE, CONN.—A meeting of the directors of the Farmington Valley Telephone Company was held at the residence of Vice-President J. H. Bidwell recently. A dividend of 3 per cent. was declared on the capital stock of $25,000, for the past six months. The stock is now quoted at $30, par $25, and very little on the market.

EL PASO, ILL.—The El Paso Telephone Company has increased its capital stock from $5,000 to $10,000.

HARVARD, ILL.—The Harvard Telephone Company has increased its capital stock from $2,500 to $5,000. The extra stock thus voted will be taken by the stockholders.

MELVIN, ILL.—The Melvin Telephone Company has increased its capital stock from $5,000 to $10,000.

NEW LISBON, IND.—The new Lisbon Telephone Company has increased its capital stock fifty shares.

SHENANDOAH, IOWA.—At a meeting to be held this week the stockholders of the Independent Mutual Telephone Company will probably increase the capital stock to $100,000. James A. Swallow is president and W. F. Brocksmit secretary.

HENDERSON, KY.—The Henderson Telephone and Telegraph Company has given the Planters' Bank a mortgage for $9,000.

WASECA, MINN.—Amended articles of incorporation have been filed with the Secretary of State by the Waseca Telephone Company, increasing the capital stock from $10,000 to $40,000. F. A. Swartwood is president of the company and Charles A. Smith secretary.

DRYDEN, N. Y.—At a meeting of the stockholders of the Dryden-Harford Telephone Company it was decided to hold stock at $12 per share; also to sell no more stock, enough now being subscribed to assure the building of the line. The following officers were elected: President, J. J. Tripp; secretary, Z. B. Lormor; treasurer, C. F. Cole; buyers, F. E. Strong and Wm. Johnson.

BEVIS, OHIO.—The Colerain Telephone Company, Hamilton county, has increased its capital from $999 to $10,000. D. A. Bevis is president.

BELLEFONTAINE, OHIO.—The United Telephone Company directors held a meeting here recently and declared a semi-annual dividend of 3 per cent.

CLINTON, OHIO.—An amendment to charter of the Clinton Telephone Company of Ohio has been filed, increasing capital stock from $50,000 to $80,000.

MEDINA, OHIO.—The Medina Telephone Company has increased its capital from $20,000 to $30,000.

FORT WORTH, TEX.—The Fort Worth Telephone Company has deposited a surety company bond in the sum of $5,000 with the city engineer as a guarantee to the city against loss that might result from blasting, which may be necessary in excavation work for the conduit system which is now being constructed.

FRANCHISES.

WOODLAWN, ILL.—The Woodlawn Park Telephone Company has been granted a franchise to install a system here. Under the ordinance the company must have at least 500 telephones in actual operation by January 1, 1905, to make good its franchise. It is permitted to charge the following monthly rates: Business, $3; residence, $2; four-party line, $2 each subscriber, business; four-party line, $1.50 each subscriber, residence. Additional rates may be charged for outside messages. The grant is for thirty years, and the company is required to pay the city compensation.

MILFORD, IND.—The town council of Leesburg has granted a franchise to the Royal Telephone Company, of this place. An exchange of about 150 subscribers will be installed. L. M. Neher is manager.

WARSAW, IND.—At a meeting of the city council here the People's Mutual Telephone Company, of Silver Lake, asked for a twenty-five-year franchise for a local telephone system. The new company proposes to cut the rate 50 per cent. from present prices for local telephone service.

WATERLOO, IND.—A representative of the Independent Telephone Company has petitioned the town council for a franchise to operate a telephone exchange and toll lines through Waterloo. One of the conditions offered in the granting of the franchise is that the company is to furnish free exchange to its subscribers.

COUNCIL BLUFFS, IOWA.—The Western Iowa Independent Telephone, Telegraph and Terminal Company and the Council Bluffs Independent Telephone Company asked for franchises at a meeting of the city council. The first-named company is the one organized recently by Dr. Macrae and his associates; the latter was organized by H. H. Van Brunt and other Council Bluffs men a year ago. The Western Iowa company proposes to make connection with one or more of the Independent companies now operating in Southwestern Iowa, the Shelby company preferred. It does not propose to establish an exchange in Council Bluffs, but will maintain a toll exchange. The Council Bluffs company is willing to place its wires in underground conduits in the downtown streets.

HORNICK, IOWA.—The Clark Automatic Telephone Company of Sioux City seeks a franchise for a local exchange. The citizens will vote on the subject March 30.

IRETON, IOWA.—The Ireton Local Mutual Telephone Company has been voted a local franchise.

AMHERST, MASS.—The Independent Telephone Company, a branch of the Home Telephone Company, of Elyria, Ohio, that is seeking to obtain a foothold in Hampshire county, will ask for an Easthampton franchise, as well as one in Amherst, and if both are granted there will be central offices in either place. At Amherst the granting of the franchise was referred to the selectmen. The company's representative maintains that for $12 a year telephones can be furnished to residences, and for a little more than that can be put in business places.

NEW BRUNSWICK, N. J.—The application of the People's Telephone Company for a franchise here has been withdrawn. This leaves the Inter-State Telephone Company, of Trenton, the only applicant.

CHURCHVILLE, N. Y.—At a regular meeting of the board of trustees franchises were granted to both the Inter-Ocean and Bell Telephone companies to construct lines in this village. The Inter-Ocean company was represented by Superintendent Wier, of Buffalo, and Nolan, of Rochester, and the Bell company by G. J. Small, of Rochester.

LEGAL.

COLUMBUS, IND.—Since the bill in the Indiana legislature permitting telephone companies to use the public highways for poles, etc., was made a law by the Governor's signature, the American Telephone and Telegraph Company made a motion in the circuit court at Columbus to arrest judgment in the case decided recently in which the company was fined $100 for obstructing the highway with poles. The argument was that since the new law permits the placing of poles on the highways judgment should be arrested in the case. Judge Hord held, however, that the hurried passage of the new law was practically an acknowledgment that a right to use the public highways for such purposes was prohibited before the new law's passage. The company may still move for a new trial or take an appeal.

TAUNTON, MASS.—Suit has been entered by Mary Brawn against the New England Telegraph and Telephone Company to recover for damage done her property by the defendant corporation. In her declaration she states that the defendants forcibly entered upon her premises on Middleboro avenue and wilfully and wrongfully chopped and cut certain trees, spoiling and ruining them. The attachment is in the sum of $500.

OMAHA, NEB.—The Howell telephone bill has been modified by a home-rule attachment, which gives the people the ultimate say whether a new franchise shall be granted by requiring submission for popular ratification of any franchise proposition.

COVINGTON, TENN.—The jury in the case of Miss Julia Pennel vs. the Western Union Telegraph Company and Cumberland Telephone and Telegraph Company, returned a verdict for $135 in favor of the plaintiff against the Western Union Telegraph Company. In August last Miss Pennel's mother died very suddenly at her home in Munford. Some of her relatives filed a message with the Cumberland company at Munford to be trans-

THE WEEK'S MESSAGES—Continued

mitted to Miss Pennel, who was visiting friends near Des Arc, Ark., apprising her of that fact. The Cumberland operator at Covington delivered the message to the Western Union Company at Memphis, who in turn claimed they delivered it to a private telephone company at Duval's Bluff, Ark. Miss Pennel never received the message. She didn't learn of her mother's death until several days after that occurrence, and did not reach home until after the funeral.

SPOKANE, WASH.—The Inland Telephone and Telegraph Company, through its attorneys, Post, Avery & Higgins, has demurred against the petition of the Spokane & B. C. Telephone and Telegraph Company, through A. D. Campbell, as it claims that Mr. Campbell is not the receiver for the Spokane & B. C., and that Mr. Fernald should bring such action.

MADISON, WIS.—The bill providing for the division of all the cities of the State into thirteen classes from 2,000 to 100,000 population, and making it unlawful for any telephone company owning and operating exchanges in two cities of the same class to charge different rates in the cities of the same class for telephone service, was given a hearing before the assembly state affairs committee recently. Representatives of several telephone companies in the State were present and made arguments. The sentiment of the committee members appeared to be divided.

RATES.

GARRETTSVILLE, OHIO.—According to the franchise granted to the Portage Telephone Company rates to any place in Portage county will be 10 cents instead of 15, as heretofore, and from Garrettsville to Cleveland 20 cents, instead of 25. Business telephones will cost $1.50 per month, and residence $1.

POMEROY, OHIO.—The Home Telephone Company recently reached an agreement with the Darwin division of the Citizens' company by which patrons of either the Home or the Citizens' lines can talk over the county.

ELECTIONS.

COER D'ALENE, IDAHO.—At a recent meeting at Wallace officers of the Coeur d'Alene Telephone Company were elected as follows: M. Prager, of Murray, president; A. G. Kerns, of Wallace, vice-president; Miss Carrie Sovereign, secretary, and P. F. Smith, treasurer.

DEEP RIVER, IOWA.—The following have been elected officers of the Deep River and Tilton Telephone Company for the ensuing year: Lee Burgett, president; F. F. Gilmore, vice-president; John Myerly, secretary and treasurer; Con. Scovil, T. Miner and W. Cranston, trustees. This was the first line to be built in the township.

NEW BEDFORD, MASS.—At the annual meeting of the Automatic Telephone Company the following officers were elected: Directors, Francis T. Akin, Frederic Tabor, Arthur E. Perry, Edward D. Sherman, Lot B. Bates, Frederick W. Besse, Vinton A. Sears, Samuel C. Hunt, Thomas Hersom; treasurer, Frederic Taber; clerk, Arthur E. Perry.

LA GRANGE, MO.—The stockholders of the Prairie Telephone Company at their annual meeting recently elected the old officers as follows: J. C. Ammernian, president; Robert Poage, secretary and treasurer; D. C. Adams and George Hoy, managers.

HOPEWELL, N. J.—The Hopewell Telephone and Construction Company has elected the following officers: President, John N. Race; vice-president, Dr. T. A. Pierson; secretary and treasurer, Theodore M. Hall; manager, J. M. Ege; directors, J. N. Race, T. M. Hall, F. F. Holcombe, T. A. Pierson, J. M. Ege, George Snowden and George E. Pierson.

HAMMONDSPORT, N. Y.—The Hammondsport and Western Telephone Company has elected the following officers: President, Robert Sherer; vice-president, Charles Benham; secretary and treasurer, J. E. Little.

CHARDON, OHIO.—At a meeting of the board of directors of the Chardon Telephone Company, Mrs. Emma Simon was elected by unanimous vote to succeed Julius E. Wilmot as manager of the exchange.

COMPETITION.

RED LODGE, MONT.—At a recent meeting of the city council the Rocky Mountain Bell Telephone Company made application for a franchise to enter the city limits. This was strenuously opposed by the business men of the city, many of whom are stockholders in the Montana and Wyoming Telephone Company, which owns and operates the local exchange.

COMBINATIONS.

SULLIVAN, ILL.—A meeting of the stockholders of the Moultrie County Telephone Company has been called to complete the details of the transfer of the lines to private individuals. C. A. Davis, of Sullivan, proposes to purchase the line from here to Arthur; George W. Spitler, of Mt. Zion, the line from Sullivan to Decatur, and C. A. Hight, the Dalton City exchange.

DUBUQUE, IOWA.—The Inter-State Telephone Company has bought the telephone line running from Tete des Mortes to St. Donatus, and the rates have been reduced from 40 cents to 10 cents.

MANCHESTER, IOWA.—The Manchester Telephone Company has been dissolved, and its stock and business purchased by the Delaware County Telephone Company. A new switchboard, with a capacity of 1,000 telephones, will be installed in the near future.

AUBURN, N. Y.—The owners of the Auburn Telephone exchange have sold the entire stock of the plant to Mr. H. H. Helm, of Morgantown, Ky. Mr. Helm will make all the line metallic circuits, thus insuring the best possible service.

FAYETTE, MO.—A. F. Davis, president of the Fayette Telephone Exchange, has bought the Glasgow Telephone exchange from Wicks & Peters for $9,000.

MILAN, MO.—J. C. Belche has purchased all stock in the Milan Telephone Company.

NIAGARA FALLS, N. Y.—Three Independent telephone companies in Niagara county were merged at a recent meeting of the Niagara County Home Telephone Company, which will do much toward furnishing the frontier of this city with long-distance privileges. The three companies merged were the Niagara Falls Home Telephone Company, the Tonawanda Home Telephone Company and the Home Telephone Company, of Lockport. They will have a capital stock of $130,000 and bonds of $500,000.

BERKELEY SPRINGS, W. VA.—The Berkeley Springs Telephone Company has sold out, in part, its plant, lines, franchises, etc., to a syndicate in Martinsburg, of which J. J. Hetzel is the head. Several of the members, however, remain in the company. The new company will extend the lines over all parts of the county, and also make outside connections with the United States Telephone Company at Martinsburg and Winchester; also with Romney and Pawpaw.

UNDERGROUND

TRENTON, N. J.—Senator McKee recently introduced a bill to compel all telephone, telegraph and electric lighting corporations operating in any city of more than 15,000 population to place all wires underground by January 1 of next year, under penalty of $10,000 for failure and $100 for each pole left standing.

CONSTRUCTION.

FAYETTEVILLE, ARK.—The North Arkansas Telephone Company contemplates installing a twenty-five line toll switchboard in its Fayeteville exchange in a short time.

PASADENA, CAL.—The Pasadena Home Telephone Company has commenced construction in Pasadena. It has purchased a lot 50 x 107½, extending back to a 16-foot alley. Upon it there will be erected a brick building covering practically all of the lot; to be not less than two stories and a basement in height. The exterior will probably be of pressed brick, though a cement plaster exterior is also under consideration. Frank W. Wachter, general superintendent of the Empire Construction Company, and C. L. Zahn, the chief engineer, are in town mapping out the work of construction for the entire system. Canvassers have already been thrown into the field seeking subscribers to the system, and the engineer is giving his attention, especially to the laying out of the conduits, which district, he says, covers more territory than that of Los Angeles.

MOULTRIE, GA.—The telephone line connecting Moultrie with Hartsfield is to be put up again. The Moultrie Telephone Company has sold the line, which it had allowed to fall into disuse, to the Spivey Bros., of Moultrie and Hartsfield. They will rebuild the line and operate it.

EUREKA, ILL.—The Eureka Telephone Exchange Company has added a new section to its switchboard and is putting in many new telephones.

GRAND RIDGE, ILL.—Manager Schuler, of the Independent Telephone Company, is authority for the statement that work will be commenced immediately on an exchange for Grand Ridge, and that lines will be built all over Grand Rapids and Farm Ridge townships.

HOLLAND, ILL.—The Holland Telephone Company will extend its line east to meet the Stewardson company, south to meet the Wabash company, and will put in a number of telephones west of Clarksburg as soon as the weather will permit.

KEWANEE, ILL.—Within a short time a new telephone line will connect Kewanee and Galva. The Henry County Telephone Company, of which F. G. Rugh is manager, and the Galva Telephone Company, have completed the preliminary arrangements for the putting up of a line connecting the two cities.

NAUVOO, ILL.—The McCall Telephone Company, at a recent meeting, decided to extend the line on to Powellton this spring by stretching another wire from Ferris entirely to Powellton. It will double-wire the Elvaston division. It has two wires into Ferris.

CHURUBUSCO, IND.—The Geiger Telephone Company, of Churubusco, is erecting a new two-story exchange building, which will be completed July

THE WEEK'S MESSAGES—Continued.

1. The company will then install new switchboards, cable, fuse boards, etc., complete. The company now has 300 subscribers, with toll lines to all neighboring towns. W. A. Geiger & Son are the proprietors of the company.

DECATUR, IND.—George Kinzle, manager of construction for the Citizens' Telephone Company, was in Berne recently installing new telephones, fixing lines and doing the preliminary work for installing a new cable. The Berne system is rapidly growing and is becoming an important factor in the company's holdings.

SEYMOUR, IND.—The patrons of the Seymour Telephone Company want more rural lines centering in Seymour. There is a strong demand from the farmers in every direction for telephone service.

SHELBYVILLE, IND.—The Mutual Telephone Company will add a new 100-drop section to its 700-drop board, making a total capacity of 800 lines.

EUREKA, KAN.—Brinkerhoff & Edwards, owners of the local telephone exchange, have built a second story on their central office. A new 400-drop switchboard has been ordered to cost $1,200.

HAYS CITY, KAN.—The Hays City Telephone Company has made arrangements to build its toll line to Russell.

OSBORNE, KAN.—The directors of the Osborne-Cheyenne Telephone Company held a meeting in Osborne recently and made final arrangements for the erection of the line. The company has been incorporated with $4,000 capital. The necessary number of poles have been bought.

OTTAWA, KAN.—The Ottawa Telephone Company will install a new switchboard that will serve eleven hundred city lines.

OTTAWA, KAN.—J. E. Byers was in the vicinity of Centropolis recently making a survey for a telephone line between Norwood and Centropolis.

DAMARISCOTTA, ME.—The Nash Telephone Company will extend its line to Glendon, South Newcastle, Alna and Head Tide. Ellis W. Nash, owner of the line, has been asked also to extend the system to East Jefferson and to lay a cable connecting Christmas Cove with Heron Island.

PORTLAND, ME.—The contracts for the North Eastern Telephone Company building have been awarded as follows: The lowest bidders under the specifications for the mason work were N. E. Redlon & Son, to whom the contract has been awarded. The excavations and foundations were awarded by Redlon & Son to D. F. Griffin & Bro. The carpenter work was awarded to Smith & Rumery. William H. Scott was awarded the metal and roof work. York & Boothby were awarded the electrical work. For heating and plumbing the contract was awarded to Willey & Calhoun.

MONROE, MASS.—At the next meeting of the town authorities they will discuss the question of building a telephone line to neighboring towns.

BALTIMORE, MD.—With the view of installing a telephone system in the public schools, the school board's committee on accounts has asked the telephone companies to submit estimates on the cost of putting in such a system.

IRON MOUNTAIN, MICH.—The Menominee Range Telephone Company intends to extend its line from Iron Mountain to Pembine. At Pembine it will be met by the Wausaukee line and by working in co-operation with other Independent companies will connect with Menominee, Marinette, Green Bay, Appleton and through to Milwauke. The range people also intend to extend the line to Crystal Falls this summer. They are trying to make arrangements with the Marquette County Telephone Company to meet them at Channing. If the arrangement goes through the Range company will at once begin the construction of the line to Channing. Other improvements contemplated are the extension of the line from Norway to Faithorn, on the Soo road, the taking out of the exchanges at Quinessec and Niagara, and having the exchanges for these places at Iron Mountain.

MINNEAPOLIS, MINN.—Plans for a North Side exchange building for the Twin City Telephone Company are being drawn by Bernard & Chamberlain, architects. The structure, which will cost $10,000, will be 38 by 68, two stories and basement, of cut stone and pressed brick.

DEER RIDGE, MO.—A telephone line is being constructed from here to Colony, Mo.

LA GRANGE, MO.—The newly organized Wyaconda Telephone Company has commenced constructing its line. The Bozarth Telephone Company, also recently organized has begun work on the construction of its line.

TRENTON, N. J.—It is announced that the Keystone Telephone Company, of Philadelphia, will begin immediately the construction of a trunk line between the Quaker city and Morrisville. This system will connect with the Inter-State service affording long distance calls in Pennsylvania.

TILTON, N. H.—The Citizens' Telephone Company is preparing to build a new line over Bay Hill to East Northfield.

BINGHAMTON, N. Y.—Work has been started at the Binghamton office of the York State Telephone Company by which the company's capacity of subscribers will be increased 400 more. The company will string 1½ miles of additional cable in Elmira, throughout the city's business center. In a short time the company proposes to dispose of the injunctions secured by parties in Tioga, Chemung and Broome counties against stringing wires between Binghamton and Elmira, and the work will be carried on. The connecting link between Cortland and Binghamton will be strung, making continuous independent connection between Binghamton, Cortland, Syracuse, Utica and vicinity towns and cities. General Superintendent Daniell, of the York State Telephone Company, who makes his headquarters in this city, says that great improvements will be made at the local office.

BROOKFIELD, N. Y.—The proposed telephone line from North Brookfield to West Edmeston will soon be constructed. Among those interested in the line are Leslie P. Curtis, John Keith, Clifton C. Craine and C. C. Chandler. C. C. Craine, John Keith and C. C. Chandler are a committee to ascertain the distance of the line by staking and to obtain bids for furnishing poles and the work of construction.

CHARLOTTEVILLE, N. Y.—The Charlotteville Telephone Company has completed its line from North Harpersfield to Jefferson. The Hubbell-Nichols company of Jefferson expects to send lines out in all directions from that place, which will include a line to Summit, one to Blenheim Hill, Shew Hollow, and Blenheim, and one in the direction of Harpersfield Centre.

COOPERSTOWN, N. Y.—Stakes have been set for a telephone line through Middlefield Center to Cherry Valley. Superintendent Ward, of the Cooperstown Telephone Company, is interested in the project; stock is being subscribed, and it is understood that there is every prospect of constructing the line.

GRANVILLE, N. Y.—The Granville Telephone Company will extend its line to West Hebron from Rupert, by way of Hebron, Chamberlin's Mills, etc. Work has already commenced on the line. Another line will be built from Shushan to Lauderdale and up the turnpike a number of miles.

MIDDLETOWN, N. Y.—The directors of the Orange County Telephone Company held a meeting recently and finally decided to order material for connecting with the Farmers' Telephone Company, of Sussex, N. J.; the Highland Telephone Company, and the Port Jervis Telephone Company. It was also decided to order material for the construction of a trunk line to Pine Bush, giving an exclusive wire between this city and that village.

NEW HARTFORD, N. Y.—The Home Telephone Company, of Utica, is setting poles and stringing wires in this village. John Ganey will be the manager of the exchange soon to be opened.

PHOENIX, N. Y.—It is reported that the Ontario Telephone Company, of Ontario, will soon commence operations on its local system in this village.

TROY, N. Y.—The New York and Northern Telegraph and Telephone Company is negotiating for poles and other material for its line. Philip S. Dorlon will be the electrical engineer of the company and Cary & Roemer the civil engineers. The rate of charges for telephones will be $12 a year for house and $15 for business service.

CELINA, O.—The Celina Telephone Company will extend its lines to a number of adjacent points in the county. The company is offering $10,000 stock at par, the money to be used for development purposes. There has already been purchased the poles and wiring to cover a system of extension of about seventy miles.

ZANESVILLE, OHIO.—The board of directors of the Muskingum Valley Telephone Company met in regular session at Beverly recently and subscribed for enough stock to complete the original capitalization of $5,000. Estimates were presented for building a through line from McConnelsville to Marietta, via Stockport, Beverly, Coal Run and Lowell. It will require in the neighborhood of $12,000 to build a first-class system from McConnelsville to Marietta, including the survey, which is partially made. Secretary-Treasurer W. W. Mason has been authorized by the board of directors to proceed at once to build the line and equip an exchange at Beverly and Lowell.

LACEYVILLE, PA.—W. J. Lewis, of the Tunkahannock and Wyoming Valley Telephone Company, was looking after business in connection with establishing and putting in a line to this place recently.

PITTSBURG, PA.—Arrangements have been made between the Pittsburg and Allegheny Telephone Company and the Johnstown Telephone Company for the construction of a telephone trunk line between this city and Johnstown, at a cost of nearly $100,000. It is understood that the Johnstown company is arranging to make connections east, and will, within a short time, have it within reach of exchanges at Harrisburg and Philadelphia.

CHARLESTOWN, W. VA.—Messrs. S. L. Hoover and H. E. Murty, the former division manager and the latter superintendent of the Winchester Telephone Company, have been in town and have decided to enclose the telephone wires here in cables, an improvement which will obviate the inconvenience and damage from sleet storms and add much to the value of the service.

MISCELLANEOUS

NEW DECATUR, ALA.—The Morgan County Telephone Company has its system completed here.

DENVER, COLO.—If certain negotiations now pending between the owners of the old franchise of the Denver Telephone Company and capitalists in New York and St. Louis are eventually put through, Denver will have two telephone companies. By reason of a decision of the supreme court some time ago the Denver Telephone Company has a franchise to do business in Denver, and will thereby become a rival to the Colorado Tele-

THE WEEK'S MESSAGES—Concluded.

phone Company, should the sale of this franchise be effected to the capitalists mentioned.

LOGANSPORT, IND.—Farmers are buying up the old telephones of the defunct Overshiner system, and are connecting them to the Cass county barbed wire fences. The barbed wire telephone promises to be extensively used.

LOOGOOTEE, IND.—The Loogootee Telephone Company, whose plant was destroyed by fire February 28, expects to begin business by April 1.

MISHAWAKA, IND.—The Mishawaka Independent Telephone exchange is now in operation. It has up-to-date equipment and starts with three hundred subscribers. The four interurban cities now each have large Independent exchanges with toll lines.

RICHMOND, IND.—The Richmond Home Telephone Company's business so far exceeds expectations that the capacity of the plant is found wholly insufficient. Eighteen hundred telephones are in use, with demands for enough more to increase the number to 2,500.

HURON, KAN.—The central office of the Mutual Telephone Association is now in operation at Huron. The southern part of Atchison county will soon contain a network of telephones, with the central office located at Potter. The lines will be owned mostly by subscribers, who will form a mutual company.

LANSING, MICH.—The extension of the Citizens' Telephone Company's line to Grand Rapids via Grand Ledge, Portland and other places has been finished from Lansing to Portland and is in condition for use between these cities.

EAST AURORA, N. Y.—The Haines Telephone Company, which has been busy for several months installing a local plant, has it nearly completed. It has 140 subscribers and is getting more every day. At present it has 110 lines working, and, with the balance, it is only a question of a short time.

BLOSSBURG, PA.—The Blossburg Telephone Company, in connection with the New York and Pennsylvania Telephone and Telegraph Company, is now about to increase the telephone subscribers' list in Blossburg and equip the office with new switchboards, etc., and give their patrons first-class service.

PERSONAL

HENDERSON, KY.—W. G. Turpin, manager of the Henderson Telephone and Telegraph Company, has been elected general manager of that company, and also of the Green River Telephone and Telegraph Company.

WILMINGTON, N. J.—E. H. Boughton has resigned from the presidency of the Delmarvia Telephone Company.

LE ROY, N. Y.—Louis Eaton, who for five years has been the manager for the Bell Telephone exchange in this village, has resigned his position and has accepted a similar position with the Inter-Ocean Telephone Company, which has just commenced the work of installing a system in this village.

ROME, N. Y.—Alderman Daniel M. Hall has tendered his resignation as manager of the Rome Home Telephone Company, to take effect upon the appointment of his successor.

BOWLING GREEN, OHIO.—W. H. James, local manager for the Bowling Green Telephone Company, has left here to take charge of the installation of an automatic telephone system in the city of Portland, Me.

NEWTOWN, PA.—Harry H. Stevens, superintendent of the Standard Telephone system in Bucks county, has resigned and will go to Chambersburg.

TRADE NOTES

The Chicago and Northwestern Railway has four trains daily running between Chicago and St. Paul, Minneapolis.

The Stromberg-Carlson Telephone Manufacturing Company, has sold a complete equipment of telephones and material to the Glasford & Canton Telephone Company, of Glasford, Ill.

The F. Bissell Company, Toledo, Ohio, has been awarded the contract for the wire and construction supplies for the Tri-State Telephone Company's new plants in Uniontown and Connellsville, Pa.

The North Electric Company, Cleveland, Ohio, has been awarded the contract for the switchboards of the Tri-State Telephone Company, at Uniontown and Connellsville, Pa. The contract calls for two central energy boards with a capacity of 1,800 subscribers each.

G. M. Gest, the subway contractor, has just been awarded additional contracts by the Brooklyn Heights R. R. Company for underground conduit work along Flatbush avenue, Brooklyn. This will be a large piece of work and will amount to many thousands of dollars.

The Stromberg-Carlson Telephone Manufacturing Company has recently sold telephones, switchboards and supplies to the following companies: Wataga Mutual Telephone Company, Wataga, Ill.; Gays Mutual Telephone Company, Gays, Ill.; Cullom Mutual Telephone Company, Cullom, Ill.; Fairbury Farmers' Telephone Company, Fairbury, Ill.; Millikan & Stokes' Telephone Company, Edinburg, Ill.; Central Illinois Telephone and Telegraph Company, Lincoln, Ill.; Farmers' Mutual Telephone Company, Ashmore, Ill.

PLANTS FOR SALE

Advertisements under this head **$1.00** *for 25 words or less for each insertion. Prepaid.*

INDEPENDENT Telephone Plant, incorporated, in 22,000 town, 650 telephones in operation; steady increase in business; central energy multiple board all new. Will sell on basis of 9 per cent. of net of last six months' business. Perpetual franchise; 50 outside toll connections. Write for full particulars to 263 Rosewood Avenue, Kankakee, Ill.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

COMPETENT Wire Chief (Long Distance) wants position, west of Illinois preferred. Address M. J. R., care The American Telephone Journal, New York.

POSITION as superintendent in constructing and equipping exchanges, farmers and toll lines; or of system in operation. Best references; 16 years' experience; salary moderate. Address LOCK BOX 635, Alexandria, Ind.

IMMEDIATELY, two steady and reliable men for positions in the West, one INSPECTOR and one LINEMAN. Give reference, experience and salary expected. Address DEADWOOD, care The American Telephone Journal, New York.

YOUNG man with considerable experience designing telephone apparatus would like to obtain position in engineering department of some operating or constructing company; references furnished. Address BOX 39, care The American Telephone Journal, New York.

IN order to complete a library of telephone literature, advertiser would purchase complete set of reports of National Telephone Association Proceedings, also any other telephone books, pamphlets, separate or complete collections. All dealings confidential. Submit description with price. Address LIBRARY, care The American Telephone Journal, Chicago.

POSITION as manager or superintendent of exchange from 200 to 300 lines; 5 years' experience on board and outside, and toll lines. Age 37; married with family; sober and industrious. Address A. W. CRIPPS, Harrison, Ark.

TOLL TICKETS.—You use them every day. 5,000, two colors, firm name, excellent design, postpaid, $2.50. Cash with order, but American Telephone Journal knows we are O. K. Write for samples. THE STUDENTS' PRESS, ALBION, MICHIGAN.

POSITION as INSPECTOR or TROUBLEMAN. Several years' experience and best of references. Address, BOX 38, care The American Telephone Journal, New York.

The American Telephone Journal

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LARGEST RAILROAD TELEPHONE SYSTEM ON EARTH

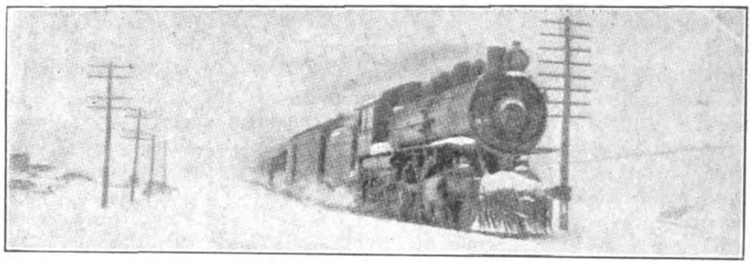
By Earl F. Edmunds.

TELEPHONES in railroading have had a development almost equal to the marvelous growth of the Independent movement. In every department of railroad work telephones now play an important part. There is not a railway system of any importance in America to-day that does not make use of them to a greater or lesser extent.

In many respects the telephone system of the New York, New Haven and Hartford Railway Company, running between New York and Boston, surpasses all others. It is probably one of the largest, has the greatest number of stations, and has a wider range of usefulness.

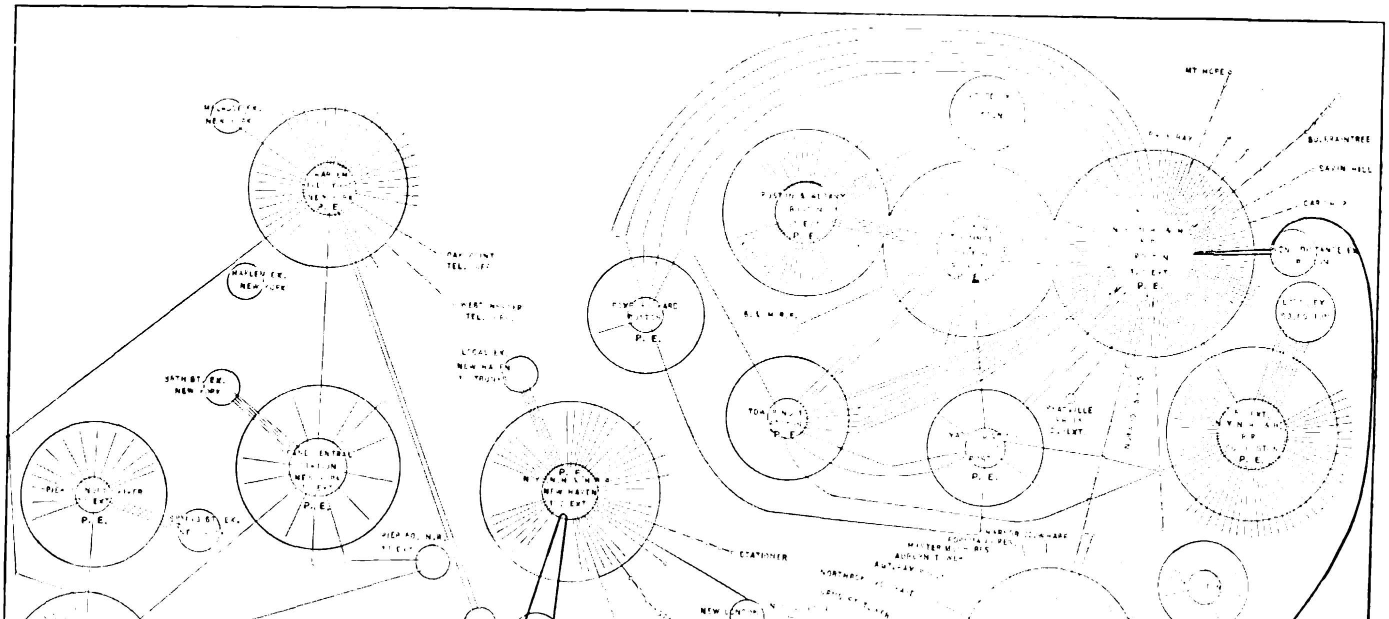
The one thing, however, that makes this telephone system unique is that it is a specialized department in charge of a practical, trained telephone engineer, Mr. B. A. Kaiser.

Other railroads, instead of creating a special department, have combined the telephone with the telegraph, under the supervision of a telegraph man. This has been a great handicap to the proper growth of the telephone. A man who has been used only to the telegraph his life long, is generally prejudiced in its favor, and then, too, he may not appreciate the capabilities or the working of the telephone. Mr. Kaiser has had a thorough training in the telephone business with the Southern New England (Bell) Company. He went with the New York, New Haven and Hartford in 1899, when its telephone system comprised only 20 stations. In 1901, he was made superintendent of the telephone department, and has since that time devoted practically his entire attention to this work. Under his management, the system has grown until there are now over 2,000 instruments in service—a larger number than will be found in many good-sized cities—with long distance and trunk lines, forming a system covering hundreds of miles.



A good idea of the magnitude of the system can be had from an examination of the accompanying chart, which is necessarily made very small. As is indicated, trunk and long distance lines connect every office of the company.

CHART OF THE NEW HAVEN ROAD'S TELEPHONE SYSTEM, EMBRACING 2,000 STATIONS.


HARLEM EX. NEW YORK
59TH ST. EX. NEW YORK
GRAND CENTRAL STATION NEW YORK P. E.
P. E.
PIER 40, N. R.
LONG DISTANCE EX. NEW YORK
NORTH RIVER NEW YORK
CORTLANDT ST. EX. NEW YORK TRUNKS
LOCAL EX. NEW HAVEN TRUNKS
P. E. N. Y. N. H. & H. R. R. NEW HAVEN
LONG DISTANCE EX. NEW HAVEN
WATER ST. YARD
NEW LONDON
STATIONER
BOSTON & ALBANY
B. & M. R. R.
MT HOPE
BRAINTREE
SAVIN HILL
PLAINVILLE
AMERICAN TELEPHONE JOURNAL

The largest private branch exchange is located in the Boston offices of the company. The switchboard here is equipped with 120 lines. In the chart all lines terminating within the outer circles represent stations within the building in which the switchboards are placed.

Running from the Boston private exchange are two trunks to the local long distance exchange used solely for long distance work. Three trunks run to the Back Bay station of the company. Five go to the Roxbury yards, where there is a private branch exchange, connecting all offices. From this Roxbury exchange, a trunk leads to Tower No. 1, running into another private branch, which gives connection to the draw bridge, yardmaster's office, and the yardmaster at South Boston. A line also runs from here connecting six other towers, and a trunk leads to Yard Building No. 3, where there is also a private branch exchange.

From the Boston private branch, the following trunks also lead: Seventeen to the Oxford exchange of the local telephone company, eleven to the Boston Terminal, seven to Tower No. 1, one to Yard Building No. 3, and four to South Boston, at all of which places there are private switchboards. A line also runs to Providence, R. I., tapping seventeen towers en route.

In the South Boston offices of the company, there is a private exchange with fifty-nine stations, and thirteen trunks to local telephone exchanges.

The Boston Terminal has a private switchboard of 34 stations, with 10 trunks to the Oxford exchange of the local telephone company. There is also one trunk to Yard Building No. 3, two to Tower No. 1, and five to the Boston and Albany branch of the company, at all of which there are private exchanges.

In the company's offices at Providence, R. I., there is a branch exchange with 135 stations, two trunks to the long distance exchange and twelve to the local exchange of the telephone company. There are also two trunks to Fall River, Mass., connecting with thirteen stations, one trunk to Newport, R. I., and one to Taunton, Mass., connecting with twelve stations.

The offices in New Haven, Conn., are equipped with a switchboard having 132 telephones connected. There are two trunks to the long distance exchange and ten to the local exchange of the telephone company. A line runs to Norwich, Conn., having eleven stations, and connecting with a private branch there, which in turn has 39 stations, and a line connecting twelve towers.

In New York City, the principal exchange of the company is at the Harlem River Freight Yards, where there are 46 stations. There are two long distance trunk lines connecting with the long distance line from Boston and Providence. One trunk connects with the Melrose exchange of the New York Telephone Company, three with the Harlem Exchange, one runs to the Grand Central Depot, and one to Pier 18-19, North River.

The Grand Central Depot private exchange has twelve stations, four trunks to the 38th Street exchange of the New York Telephone Company, one to Pier 18-19, North River, and one to Pier 50, North River.

At Pier 40, there is an exchange with 13 stations, four trunks to the Spring Street exchange of the New York Telephone Company, and one to Pier 18-19. At the latter place there is a switchboard with 29 stations. Seventeen trunks run to the Cortlandt Street exchange of the New York Telephone Company, one to the Grand Central Depot, two to the New York long distance exchange, one to the Harlem River Freight Yards, and one under the North River to the Jersey Bridge Line, giving connection with all railroads in New Jersey.

It is difficult to determine the most important business for which the New York, New Haven and Hartford's telephone system is used. Probably it is in the moving of trains in the various yards. For train dispatching the telegraph is still relied on solely. In the yards, however, the telephone has been found invaluable. Twice as much yard business can be accomplished as was formerly the case and with much less friction. As the yard at the Boston Terminal is the largest, it will serve as an illustration of the work of the telephone in all other yards of the company.

The yardmaster and his assistants here have complete and instantaneous control of all train movements. They have telephones in their offices connected directly to the Terminal branch exchange at the main station. At every switching and signal tower, and at every point in the yard there are telephones also connected with the branch switchboard. The yardmaster telephones to the proper switching and signalling towers on the arrival of a train, gives orders as to its route through the yard, and designates the track it is to take. The tower switchmen and signalmen, by using their telephones, keep in close working touch with each other. The yardmaster can also telephone to the car sheds as to the disposition of cars, or ask for extra cars; or he can reach the locomotive department with orders relative to the movement of engines, etc.

In the freight yards, too, the telephone is of incalculable value, being used in shifting cars, making up trains, and similar work as in the passenger yards. The repair shops, car sheds, building department, transportation department, baggage department, and every branch and department of the system are guided and controlled by telephone.

Several short lines, such as the one between Boston and Providence, have all the towers equipped with telephones. A towerman can call up the next tower and ask for instance: "Has 3299 passed you yet?" etc., and thus be greatly facilitated in keeping a clear track. These towermen can keep in perfect touch with each other, rendering the railroad safer and more efficient. The use of telephones in the towers is still in the experimental stage, but it has been so successful that in the near future the whole road will probably be thus equipped. Mr. Kaiser says, if an emergency should come, making it advisable, he could have a telephone in every tower within 24 hours.

The long distance lines of the company are used very little in railroad work proper. They are confined almost exclusively to the transaction of official business, and it is a safe assertion that they are not idle a minute, day or night. There is but one through line from Boston to New York connecting with Providence. A system has been devised, therefore, for storing calls while the line is in use, so that delays in securing long distance connections are reduced to a minimum. The long distance lines are handled by operators whose sole duty it is to make long distance connections. If the president of the road, for instance, is talking from Boston to New York, and the general passenger agent wishes to use the line, the operator makes a note and as soon as the president has finished, she calls the passenger agent and gives him the desired connection. In this way, calls are stored all day long, and the full usefulness of the line secured.

At Boston and Providence, the long distance lines terminate in the long distance exchange of the local telephone companies, which are connected with the various private branch exchanges by trunk lines. The line at New York, however, runs directly into the private exchange at the Harlem River Freight Yards. All business to New York is handled through this office, connections being had to other New York offices by trunk lines.

Patrons of the road find the telephone system a great convenience. At Pier 18-19, North River, there are two branch switchboards, the smaller one being used exclusively for reserving staterooms on the Fall River steamships of the company.

Mr. Kaiser is a firm believer in the value of the best construction. The entire telephone system is standard. All lines are full metallic, the short lines of No. 12 copper wire, and long distance lines of No. 10 copper wire. They run mostly on telegraph poles, although much underground work is used where necessary in cities, etc. There is very little noise from inductive disturbances, the lines being transposed where necessary. The line running from Boston to Providence has not a single transposition, the tower telephones which are bridged on it giving practically the same result.

As showing the good construction of the entire system, Mr. Kaiser says that during the severe storms of last winter there was but one case of line trouble and that was caused by some poles of the Wester Union Telegraph Company falling on the railroad's line.

A rigid system of inspection is maintained. Each station is examined every three months or oftener, if necessary, and the reports kept on file in Mr. Kaiser's office. Here also is a record of every telephone instrument in the system, with its number and location.

A special battery is used, the invention of Mr. Kaiser. It is an ordinary carbon cylinder with a pencil-shaped zinc, and a secret depolarizing solution. It has stood the hardest usage, and has proven itself thoroughly satisfactory and efficient.

The telephone department, under the management of Mr. Kaiser, is constantly making experiments and improvements. He is now preparing to test the efficiency of the phantom circuit for telephoning and telegraphing over the same circuit simultaneously.

SOME STEPS IN THE EVOLUTION OF CIRCUIT DESIGN—COMMON BATTERY CORD CIRCUIT

By J. C. Kelsey.—*ARTICLE XII.*

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FIG. 80 shows the application of the shunt, 1/3 *R*, to the answering cord circuit. The act of plugging in cuts off battery, restores it again, and if the subscriber is off the hook the relay R^2 is energized, and closes its contacts, putting 1/3 *R* in shunt with cord lamp, *CL*, and putting *CL* out. When the subscriber hangs up the receiver, battery can no longer flow through R^2, because the circuit is open. It therefore releases its contacts, which open circuit of 1/3 *R*, and allows lamp, *CL*, to burn at its full brightness. The operator knows that the subscriber has hung up the receiver, and pulls down the connection.

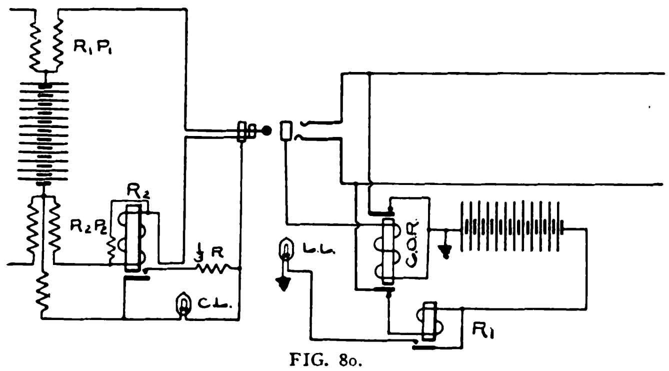

FIG. 80.

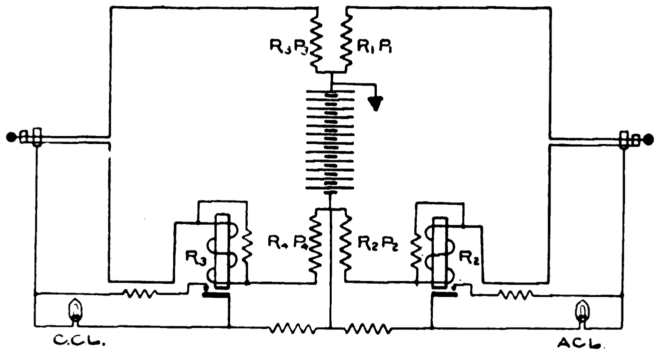

FIG. 81.

So far we have considered only the answering part of the cord. The calling cord possesses the same characteristics of the answering cord as regards the position of the relay, and the action of the calling lamp. The general characteristics of the complete cord are shown in Fig. 81. The calling cord is provided with keys, both for ringing, talking and listening to the subscriber. Fig 81 only shows four sections of the repeating coil, R^1P^1 and R^2P^2, belonging to the answering cord, and R^3P^3 and R^4P^4, the sections belonging to the calling cord. They are all wound on the same core, and serve the same purpose as they did in local battery service, that of connecting grounded and metallic lines without unbalance. When both parties have their receivers off the hooks, both lamps, *ACL* and *CCL*, are out, because relays R^2 and R^3 are energized by the current passing out to the subscribers' stations through them. When both parties hang up, R^2 and R^3, release contacts, because no current flows.

The repeating coil shown in Fig. 81 consists of four sections of wire, each one having two terminals brought out. All four coils are wound on the same core. When used with common battery, the coil should be connected up as shown in Fig. 81. If used with local battery the outer terminals of R^1P^1 and R^2P^2 are connected to one-half of the line and the inner terminals connected together. Similarly the outer terminals of R^3P^3 and R^4P^4 are connected to the other half of the line, and the inner terminals connected together.

In this manner battery is supplied to all cord circuits of this kind, and the impedance of each of the windings guards against the invasion of cross talk, while the repeating coil, as a whole, removes the possibility of unbalance. Each half of the coil repeats into the other half, just as if the battery was not present. It seems strange that a wave can pass through the battery solution and not interfere with the induced wave it has created, but the battery has such an infinitely small resistance that it acts like a short circuit path, where everything can pass.

Editor's Note.—The first article in this series appeared in the issue of November 29. They will continue for many months.

FOREIGN CURRENTS

By *"The Arrester."*

A STRIKNG example of the unreasonableness of some telephone subscribers is contained in a lawsuit reported in the London *Electrician*. The National Telephone Company sued a subscriber for an amount of about $12 for moving a telephone instrument from one house to another, and the defendant repudiated the liability and counterclaimed for $125 in respect of alleged breach of agreement. It appears from the evidence that the defendant had been a subscriber since 1898, and, on recently changing his address, wrote to the company to remove his telephone to the new house. The new address was in a district served by a central energy exchange, whereas the old one was in a magneto district, so the company installed at the new address a new common battery instrument. Whereupon the subscriber objected that the company had not followed his instructions to remove his old instrument and refused to pay the cost of the removal. The fact that the old instrument would not serve at the new address was explained in court, and it was held that the defendant had consented to the substitution by using the new instrument. "Defendant surely could not complain," added the counsel, "because he had a new instrument." The judge, however, thought differently. "Yes, he can," came from the bench. "The order was to remove the old one. You might have put in an inferior instrument. The objection may be purely technical, but there it is. I hold that the plaintiffs are not entitled to recover, on the ground that they had no order to fix a new telephone." Which goes to show that if telephone subscribers occasionally lack common sense, judges do also. This is probably the first case on record of the kind, and surely it is a rare thing for a telephone subscriber to conceive such an affection for his old telephone as to prefer it to a new one giving an improved service.

Post Office and Marconi Company

The pet grievance of the Marconi Company seems to be that the Post Office in Great Britain will not give Marconi messages the free run of the Post Office telegraph system. As in any other question there is something to be said on both sides. The Post

Office, before consenting to act as the agent of the Marconi Company all over the country, wishes a reasonable assurance that the Marconi Company is in a position to give the public a reliable and steady service. Obviously the Marconi Company is not yet in a position to give any such assurance. Perhaps it soon will be, and whenever it is there should be no further difficulty on the score of a working arrangement as regards traffic. There are two other questions in the background, however, which have quite been lost sight of in the wave of enthusiasm and press hysterics over Marconi's recent spectacular achievements. One is the question of patent rights; for Marconi, if the most pushing and energetic both from a scientific and from a commercial point of view, is not the only worker in the wireless field; and the other relates to the government monopoly in telegraphy that obtains generally in European countries.

Government Telegraph Monopoly

The government telegraph monopoly has throttled the development of telephony in almost every European country. How far government officials are prepared to go in the assertion of their legal rights was shown recently in France, when a wireless telegraph station, set up by French experimenters, was "raided" by the police as if it were a New York gambling hell. The London *Electrical Engineer,* alluding to the Marconi boom, hints that financiers are largely responsible for it, and goes on as follows to discuss the real position of wireless telegraphy as a commercial undertaking: "Mr. Marconi may be one of the most estimable of living men, most enterprising and energetic, but it is said with a vast amount of truth that there are systems other than Marconi's, and that much of his success is due to the adoption of details belonging to other inventors and patentees. The point we have to consider has nothing to do with the truth or otherwise of any of these statements, but is that any and all practicable systems of telegraphy are government property under the Telegraph Acts, and that investors invest their money at their own risk under the proviso that at any moment the Post Office may lay an embargo on the work, saying, 'This is our privilege and not yours.' "

Attitude of the Government

There is no getting away from the feeling that whenever the government deems its monopoly in danger from competition, it will obtain a legal opinion that this new departure comes within the four walls of its charter. The brief history of wireless telegraphy contains some such record as this: that the government officials have probably kept themselves fully acquainted with every step that has been taken; that originally they and Marconi were experimenting in common; that for some reason or other, probably because other systems seemed more promising, there was a severance, Marconi going his way, the officials theirs. The former has obtained private assistance, and has greatly developed his system; has seen it usefully adopted in various directions, and sees its use rapidly extending where the conditions are favorable. Naturally, Marconi and his friends desire to prove his system suitable to other conditions, hence their constant experimental work, the results of which we have continually before us, either accurately or otherwise stated. Thus private enterprise is exploiting wireless telegraphy as it exploited telephony. Will the result be the same, and a government department reap the crop the seed of which it has not sown, but which has been sown and paid for by private individuals? Of course, as stated previously, we assume that Marconi is going to do all his friends promise—at present we cannot see the least possible chance of this being done—and if such a state of things comes to pass, we ask "What will be the position of the government as a monopolist, and what the position of the investors in the Marconi development of wireless telegraphy?" What, indeed? Look at the telephone and consider.

ELECTRICAL MEASUREMENTS—ARTICLE IX—THE VOLT-AMMETER METHOD

By Arthur Vaughan Abbott.

In the previous paper the difference between a voltmeter, or pressure measurer, and an ammeter, or current measurer, were set forth and shown to lie chiefly in the method of winding the moving coil that forms the active portion of the instrument. There is still another way of making ammeters, which will presently be described; but prefatory thereto let us consider a little the use of the ammeter and the methods of measurement to which the joint use of both an ammeter and a voltmeter lend themselves. There are many makes of voltmeters, but relatively few of ammeters, particularly of those of high range, as their construction practically presents much more difficulty on account of the heating effect of large currents. The chief external difference between a voltmeter and an ammeter lies in the binding posts, which in the ammeter are very large and heavy, to accommodate the powerful leads necessary to carry heavy currents. The office of the ammeter is solely to measure the amount of current which is passing in any circuit. For this purpose the circuit whose current is to be measured must be opened and the ammeter inserted in series so that it forms an integral part thereof, through which *all the current must flow* as soon as the circuit is closed. After the insertion of the instrument, a reading of the needle indicates at once the current in amperes—nothing could be simpler. Evidently the resistance of the ammeter must be very low, so small, in fact, that its addition to any circuit will cause no appreciable change. Like voltmeters, ammeters can only be built to cover a somewhat limited range in a single instrument, but by getting two or more, any capacity may be secured. For the telephonist the most useful instrument is one reading to about 50 amperes, each scale division representing one-half an ampere.

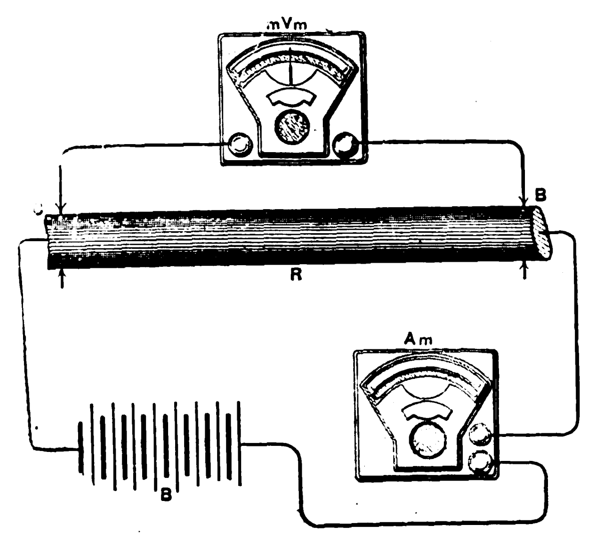

FIG. 1.

In a previous article some methods of measuring high resistance with a voltmeter were detailed. There are many cases in telephone work where it is necessary to measure very small resistance, such, for example, as would be presented by the blades of a switch upon a power board which failed to make good contact. With an ammeter and a milli-voltmeter, *low* resistance of all kinds can be very readily and very accurately measured. The operation consists in connecting a battery, the low resistance to be measured and the ammeter in series and noting the amount of current which flows. At the same time a milli-voltmeter is connected *around* the resistance so that the fall of potential, or the

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Editor's Note.—The first article of this series appeared in the issue of January 17. They will continue for over a year.

electromotive force which is required to force the current *through* the resistance is also measured. When these two quantities are known, two factors, namely, the electromotive force and the current, in Ohms' formula, are obtained, and it is easy to calculate the third. The telephonist has frequent occasions to measure the resistance of very large and heavy conductors, such as the bus bars on the back of a switchboard, which might be giving rise to cross talk, or the various connections of a common battery through the power switchboard, and its numerous instruments, to the circuits which distribute electrical energy to the telephone switchboard. The method just described is exceedingly convenient for the purpose. It is illustrated in Fig. 1, in which *C B* is a portion of a bus bar or other large conductor whose resistance is desired. *B* is a storage battery or other source of electrical supply, one pole of which is connected to the bus bar, *C*, while the other pole runs to one binding post of the ammeter, *A m*. From the other terminal bar a conductor is taken to the other end of the bus bar. At each contact on the bar care must be taken to make an exceedingly good contact, so that there may be as little fall of potential between the leads and the resistance to be measured as possible. A milli-voltmeter, *m V m*, is attached to the bus bar at the points *C* and *B*, between which the resistance is desired. Now the reading of the ammeter shows the amount of current which flows through the bus bar. A simultaneous reading of the milli-voltmeter gives the fall of potential *between* the points to be measured for resistance, or, in other words, the electromotive force that causes the current indicated by the ammeter. For example: Suppose it is desired to measure the resistance of a copper bus bar ¼" in diameter and that when the apparatus is arranged, as shown in Fig. 1, the ammeter shows a reading of 2½ amperes and the milli-voltmeter a reading of 5 milli-volts, the resistance is given by the expression $R = \frac{.005}{2.5} = .0002$ ohms.

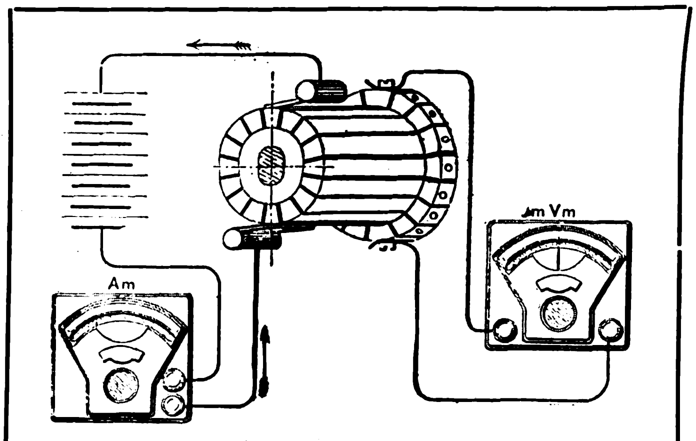


FIG. 2.

The same method may be very conveniently applied to the measurements of the resistance of dynamo armatures. Thus, in case of any trouble with the charging generators of a telephone power plant, this plan forms a convenient way of detecting the existence of either a short circuit or open coils. The apparatus should be set up as shown in Fig. 2, one pole of the storage battery being applied to any commutator section, the other pole running to one terminal of the ammeter, *A m*. From the other binding post of the ammeter a lead is carried to the commutator section directly opposite to the first one. The milli-voltmeter is connected to the same two sections, as shown in the illustration, and from the simultaneous readings of the two instruments the resistance of the armature and its coils may be at once calculated. To test all the coils of a dynamo the contacts may be arranged as sliding springs and the armature slowly revolved under the contacts and thus faults at once detected.

Fig. 3 shows the further application of this method to the measurement of switch resistance, an exceedingly interesting investigation to the telephonist, as in many cases poor hinges and bad blade contacts may give rise to cross talk in the operators' transmitters or even in the subscribers' circuits. As shown in this illustration, the ammeter is connected in series with the switch terminals and the battery, while the milli-voltmeter is connected across the terminals, and the resistance of the switch can be ascertained as soon as the two instruments are read. In Fig. 4 this method is shown applied to measure the resistance of a switchboard ammeter, such as is commonly supplied to power boards in common battery exchanges, for occasionally a contractor will install an instrument of so high a resistance as to be unsuitable for the purpose, and sometimes the ammeter contacts become loosened and introduce sufficient resistance to cause cross talk. The circuit in Fig. 4 is self-explanatory. In the measurements of small resistance we have assumed an ammeter capable of reading a considerable current and a milli-voltmeter adapted to read small differences of potential. But this method may be extended to embrace the measurement of large resistances by the use of a milli-ammeter capable of measuring small current and of a voltmeter capable of measuring large differences of potential.

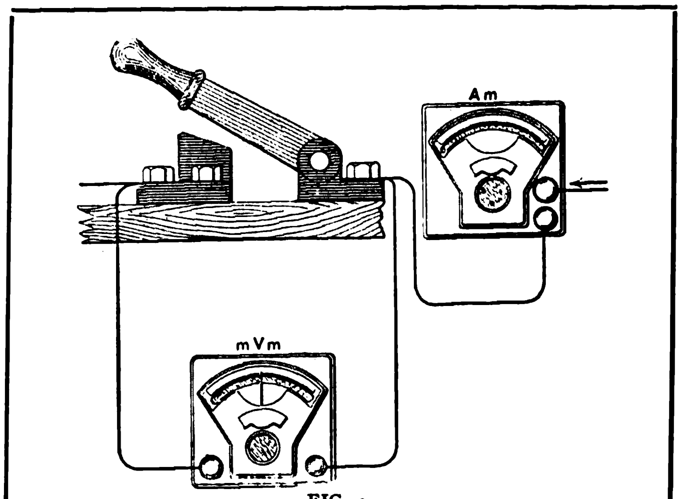


FIG. 3.

To illustrate this modification, suppose a case in which the voltmeter should read 142 volts and the milli-ammeter 10 mil amperes, $R = \frac{142}{.01} = 14200$ ohms.

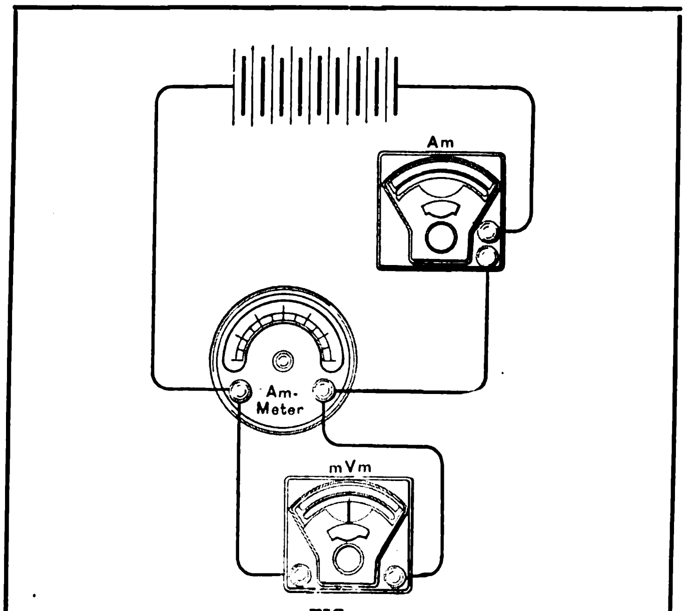
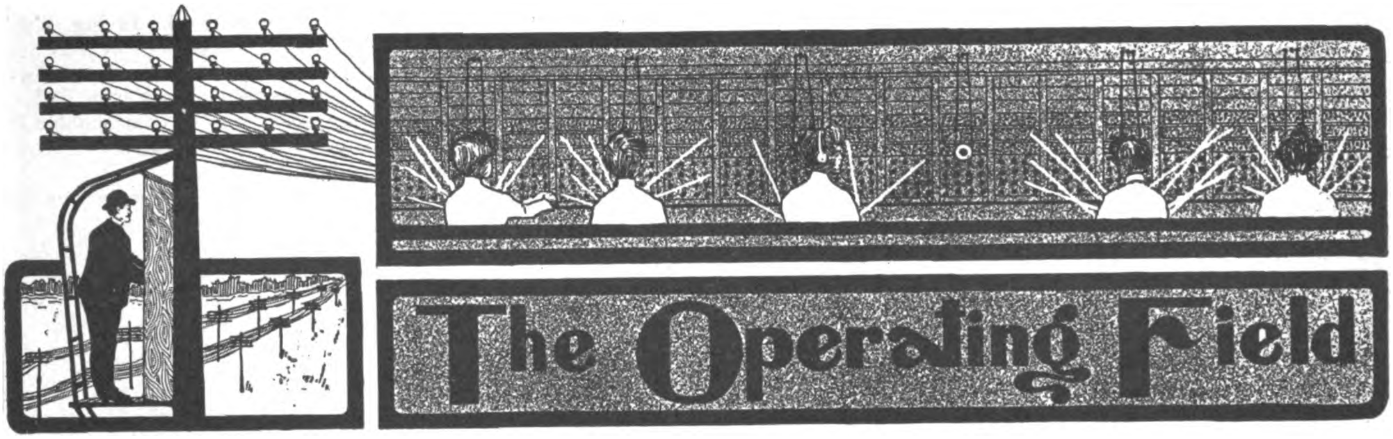


FIG. 4.

From these illustrations it is evident that the possession of a milli-voltmeter and a milli-ammeter and an ammeter and a voltmeter will enable the electrician to make a very wide series of measurements, for with the milli-ammeter and ammeter currents of almost any range can be measured. The voltmeter and the milli-voltmeter enable the estimation of electromotive force through a correspondingly great latitude, and with both instruments all sorts of resistance measurements can be made.



The Operating Field

NEW KANSAS COMPANY NOT A MERGER.

By J. A. Carr, *Special Correspondent.*

According to a press dispatch, the Independent telephone companies of Manhattan, Abilene, Beloit, Minneapolis and Concordia, Kansas, have been merged into one concern, to be known as the Union Telephone and Telegraph Company, with headquarters at Abilene. The capital stock of the company will be $150,000. The stockholders are: W. W. Dilworth, A. T. Rogers and F. M. Daily, of Beloit; G. A. Rogers and C. L. Brown, of Abilene; J. W. Smith and F. L. Flint, of Minneapolis; C. P. Dewey and H. P. Wareham, Manhattan, and F. W. Dougherty, Concordia.

T. W. Dorn, manager of the Independent Telephone Company of Junction City, who was one of the men who assisted in organizing the Union Telephone and Telegraph Company, says the above press dispatch announcing the incorporation of the latter company, making it appear that it is a merger of the telephone companies at Abilene, Beloit, Concordia and Manhattan, is entirely incorrect. The company was formed, and the stocks taken by the telephone companies of Abilene, Beloit, Junction City and Minneapolis, for the purpose of constructing trunk toll lines between Abilene and Topeka to connect with the lines now under construction between Kansas City and Topeka. The Union Telephone and Telegraph Company will have nothing to do with the business of the local exchanges that own the stock, but will do a toll business exclusively, connecting with all Independent exchanges in the eastern and central part of the state. Work on the lines is already under way.

RESTAURANT TELEPHONES.

The Hotel Rudolph in Atlantic City, N. J., will have a telephone on every table in its grotto cafe. During the summer months this cafe is crowded to its capacity all day and practically all night. While there are a small army of waiters in the place, it still seems that they cannot get around fast enough. Sometimes people come in and sit down at a table which has just been vacated by another party, and the waiter, believing that it is a party about finishing, will sometimes stand a little while before he realizes that they have not been served.

In order that this may be entirely overcome, and to expedite the service to the patrons of the grotto, the manager is now having telephones placed at every table in the grotto. These will connect with a central station which will be the headquarters of the waiters, and they will thus be enabled to be in touch with the customers all the time.

SOUTHWESTERN NEBRASKA ASSOCIATION.

A meeting of the Southwestern Nebraska Telephone Association was held at Falls City, Neb., recently. There were representatives in attendance from the Independent telephone companies of Sarpy, Cass, Otoe, Nemaha and Richardson counties, as well as the neighboring territory in Missouri. A considerable amount of business was transacted. One of the most important resolutions adopted was the following:

Whereas, There is now pending before the Legislature of Nebraska a certain bill known as the "Revenue Bill," and

Whereas, It is contemplated by said bill to tax telephone companies upon their tangible property and also upon the gross receipts of said companies; now, therefore, be it

Resolved, That the Southeastern Nebraska Telephone Association, now in session at Falls City, Neb., at which representatives of the following companies are present: Plattsmouth Telephone Company, of Cass County; Home Telephone Company, of Sarpy County; Nebraska City Telephone Company, of Otoe County; Auburn Telephone Company, of Auburn, Neb.; Stella Telephone Company, of Richardson County; Humboldt Telephone Company, of Richardson County, and Falls City Telephone Company, of Richardson County, that the effect of said bill, if enacted into a law, will be to impose a system of double and consequently unjust taxation upon the telephone companies of Nebraska, and the attempt to tax such companies upon their gross receipts is unreasonable and unjust.

The following were present at the meeting: I. D. Clark, of Springfield, Neb.; T. H. Pollock, of Plattsmouth, Neb.; Thos. H. Ewing, of Plattsmouth, Neb.; A. M. Munn, of Nebraska City, Neb.; J. C. Killarney, of Auburn, Neb.; C. H. Thomas and H. E. Clark, of Stella, Neb.; A. H. Fellows, of Humboldt, Neb.; J. B. Stafford of Tarkio, Mo., and several representatives of the Falls City Telephone Company.

A UNIQUE TELEPHONE COMPANY.

A company composed of a number of students of the Iowa State College has just established a telephone exchange covering considerable territory in the residence portion of the town of Ames, Ia., operating the system Independent of the Iowa (Bell) Telephone Company. The enterprise is a unique one, as it is strictly a student affair and already the names of thirty-seven subscribers appear on the list, which is rapidly increasing. The exchange has complete metallic circuits, being built on the central energy system. The switchboard was constructed by members of the company attending the electrical engineering department of the college, with self-restoring drop and power ringer. The officers of the company are A. L. Young, of Manson, president; Don G. Mullan, of Pomeroy, vice-president; C. B. Harding, treasurer; W. H. Healy, general manager; L. S. Hamm, of Tipton, electrician. Directors of the company: A. L. Young, J. L. Cutter, of Orchard; W. H. Healy, T. A. Minassian, of Des Moines; Don G. Mullan, R. E. Davis, of Des Moines; L. S. Hamm.

OPPORTUNITIES IN THE SOUTH.

The People's Independent Telephone Company, of New Iberia, La., is being urged by the Business League of Gueydan, in the same state, to extend a line to Gueydan and install an exchange. The Business League promises at least 100 subscribers to the new exchange and asks that the People's Company also give toll connections.

Behind this petition is a story that is interesting. The Cumberland (Bell) Telephone and Telegraph Company, several years ago, secured a franchise in Gueydan upon its promise to give free toll connections to certain points. The people of Gueydan were more anxious to have these toll connections than they were for the local service, as it was far more valuable to them. As soon as this franchise had been secured the Cumberland Company constructed an exchange and secured about 91 subscribers. It had a few toll lines run into Gueydan, but as soon as it began operation, an exorbitant rate was fixed for all toll connections.

The Cumberland company refused to give free toll service as promised and the people refused to pay. The authorities have ordered the Cumberland to vacate the town. So the town has no telephone service except over a few private lines.

Mr. R. F. Hogsett, president and general manager of the People's Telephone Company, in writing to The American Telephone Journal from Iberia, says of the condition in his section of the country:

"The Independent movement in Southwestern Louisiana is advancing very slowly, owing to the lack of sufficient capital. But the above instance is one of the many good opportunities for investment which are to be found all over the territory. Not only are the Independent companies hampered by lack of capital to take care of local business, but they have great difficulty to get money for constructing any long distance or toll lines whatever.

"These toll and long distance lines are the strong points of the Cumberland system and it realizes this. Its most strenuous efforts are directed to keeping people from investing their money in any Independent lines. It is my firm conviction that if we could interest some of the many Independent companies in Texas, Arkansas and Tennessee to help us out with their long distance lines, it would result in knocking the Cumberland out of nearly every town in this state and would be a paying investment for the long distance companies."

WEATHER REPORTS BY TELEPHONE IN INDIANA.

By H. S. O'Brien, *Special Correspondent.*

W. T. BLYTHE, of the Indianapolis, Ind., Weather Bureau, has received a request from the New Home Telephone Company, of Greene county, with headquarters at Worthington, Ind., asking for the weather forecast daily to serve to its patrons.

Forecaster Blythe has asked the chief of the bureau at Washington for permission to telegraph the forecast to the Worthington office of the company. Forecasts by telephone are becoming fixed customs at rural telephone exchanges. A service of that kind is now being given to farmers living near New Augusta.

Every morning at 10 o'clock the Indiana weather bureau calls New Augusta and orders the operator to send in a general call. The operator then makes all connections on her line and rings six times. This is known as the weather call. All patrons of the line that want the weather prediction for the following thirty-six hours go to the telephone and take down the receiver. The local bureau then repeats, slowly and distinctly, the weather forecast.

There are almost three hundred telephones on the New Augusta line, most subscribers being farmers.

IOWA MUTUAL ASSOCIATION ORGANIZED.

THE Green County Farmers' Mutual Telephone Company was organized at a meeting of representatives of rural telephone lines at Jefferson, Ia., recently. By-laws were adopted and officers elected.

Directors were present from Grant and Franklin, Branch No. 1; Jackson Branch No. 2, and Hardin Branch No. 3. J. E. Snodgrass was elected president pro tem.; W. H. Smith, secretary pro tem.

For the county organization the following directors were elected: Grant and Franklin No. 1, G. A. Wiggins, J. E. Snodgrass; Jackson No. 2, W. H. Smith, J. H. Albert; Hardin No. 3, B. Shilling, L. P. Blodgett; Jefferson Branch, S. C. Culbertson, R. G. Howard.

The Board of Directors elected the following officers for the county organization: Henry Haag, president; Jos. Thompson, vice-president; J. A. Henderson, secretary; S. J. Sayers, treasurer.

GEORGIA INDEPENDENTS ACTIVE.

THE Independent telephone movement in Georgia is on a boom. The principal company there is the Georgia Telephone and Telegraph Company, which operates a local exchange in Savannah and long distance lines that practically cover the state.

Mr. C. S. Kenyon, treasurer and assistant general manager of this company, says in a letter to The American Telephone Journal:

"We have been making steady progress in Savannah and have the extreme satisfaction of being able to say that we have a larger number of subscribers than the Bell company. New business is coming in in a very satisfactory manner.

"The Bell company is resorting to the usual tactics and has made a cut in its rates bringing them down to $1.50 per month. It is making rates for business houses in accordance with the amount of good or influence that the subscriber can accomplish in its favor. Where a subscriber can be of a great deal of help to the Bell, the rate is usually expressed by a string of naughts. But where he cannot, or will not, help the Bell, the rate is $5.00 per month.

"We have just completed a line connecting the town of Statesboro with Savannah. There is quite a flourishing exchange at Statesboro and the local company there has a number of lines radiating into the surrounding territory, so that the completion of our lines brings a larger portion of southeastern Georgia into connection with Savannah. There is now much talk of connections being established between Statesboro and Augusta."

USE OF TELEPHONE FOR SPECIAL DELIVERY MAIL.

FIRST Assistant Postmaster-General Wynne has sent to the United States Senate an interesting communication relative to the use of the telephone in the collection and delivery of special mail matter. Mr. Wynne says:

"In the year 1901-2 postmasters at the following offices were authorized to adopt the system of collections and delivery of local special delivery mail matter in response to telephone and other calls: Buffalo, N. Y.; Gardner, Mass.; Macon, Ga.; Saginaw, West Side, Mich.; Carthage, Mo.; Dayton, Ohio; Syracuse, N. Y.; Concord, N. H.; Fort Scott, Kan.; Lowell, Mass. The service is also in use in the Washington, D. C., office.

"A person who desires to send a special delivery from one part of the city to another, deposits the same at any station, with ordinary postage properly prepaid and special delivery stamp. The clerk in charge of the station immediately calls up the main office and requests a messenger, who goes direct to the station, receives a letter or package, and delivers it direct to the addressee. This service can only be used at such offices as have contracts or arrangements for use of telephone without charge.

"The practice at the Washington office is that at the end of each day the clerk in charge of the station is required to furnish the main office, on a blank provided for the purpose, a statement of all special delivery matter dispatched in this manner from his station.

"In the time the service has been in operation, it has been appreciated by the public and used to a large extent for local mail.

"In reference to the use of telephones for the delivery of rural mail matter, it is felt that it is practicable to use the telephone in connection with the rural free delivery service, especially in those counties or communities in which the service is well established, and the telephone generally used by the farmers or by country stores."

THE TELEPHONE IN HORSE RACING.

THE presence of many telephones at the Memphis, Tenn., race track, each located at training quarters of the many owners getting ready for the real spring season of racing, has caused the Memphis Jockey Club officials to discuss the advisability of the telephones remaining in working order on racing days at Montgomery Park.

Several years ago several members of the Memphis fin de siecle set were caught telephoning from the fashionable clubhouse direct to Hot Springs and getting the result of a race to confederates there before the official result was sent in. The clubhouse at Montgomery Park is located a sixteenth of a mile up the home stretch, and when a horse enters the stretch looking like a winner the local bettors, having meantime made long distance telephone connection with Hot Springs, flashed the probable result several seconds before any other news arrived. All went well until the day that Wild Pirate passed the clubhouse a sure winner, leading his field by many lengths. This news was communicated to Hot Springs and bets were placed. Wild Pirate was disqualified for rough work on the part of his jockey and the "sure thing" bettors lost their money. The news leaked out and thereafter telephonic communication was always cut off on each racing day at the Memphis track.

Opinion and Comment

AN ENLARGED PAPER.

THE AMERICAN TELEPHONE JOURNAL appears this week with four new advertising pages and two new pages devoted to technical articles. These additions will be permanent, as it is the policy of the management not to take a forward step until it is justified by business demands, and then to maintain the advance. Naturally, we feel very proud of the growth that makes the present additions necessary, as they come in recognition of the efforts we have steadily made to put this paper on the highest plane ever achieved by a technical publication, and of the proven powers of our advertising columns as the best business makers in the field. But we are even more gratified by the fact that the increase stands for something beyond this; that it shows in a substantial and concrete form the steady growth of the Independent cause. In this feature of our expansion all engaged in the art of telephony will see cause for personal satisfaction. It means that the business is enjoying a degree of prosperity paralleled by few industries, even in this era of industrial growth. Careful students of the telephone situation will not need the evidence of our growing columns to make clear this general telephone development. But most men engaged in the business and the lay public generally, have not the time to study figures and conditions, and to them such a state of facts as we are privileged to show in this issue of our paper will seem more convincing than whole pages of summing up. If our increase was merely spasmodic it would of course have no weight as an index of the general situation. But, as we have stated, it is permanent, and therefore of convincing value. To the workers in the field who are engaged in developing telephone properties our announcement of an enlarged issue will mean much. The facts need only be presented to insure the attention of the most timorous capitalist. Incidentally the work of interesting capitalists in Independent telephony is growing easier with each day. There are so many companies in the field who can show profits of 15 to 25 per cent that it is no longer a great task to find money for extensions and new construction. If we have borne even a slight share in producing this gratifying state of things, we have been amply repaid by our steadily growing subscription lists, the kind words of our readers, who have sent us over a thousand letters, and the appreciation of our advertising patrons.

THE UNRELIABILITY OF AVERAGES.

THOSE of our readers who have followed closely the arguments advanced in our columns by "The Listening Key" must have been particularly impressed with the matter presented by him last week under "Contemporary Cross Talk." Speaking of the unreliability of averages in all matters pertaining to telephone traffic, "The Listening Key," whose expositions on this subject are undoubtedly accepted as standard by all practical men, pointed out that the "equality of equipment" is only apparent in considering exchange conditions, "and quickly disappears on investigation." That he is right in his conclusion may be easily ascertained by approaching the subject from another direction.

The unit of multiple switchboard is the section. At first sight that is a clear and definite unit, and as far as framework and multiple jacks and operating equipment are concerned it is. But the real capacity of the section—its capacity in answering jacks connected to working lines—is determined by the aggregate daily traffic to be expected from those working lines. The traffic that can be handled at a three-position section we have put at three thousand calls daily. If we were to get only one call a day from each line we could work three thousand lines at a section; if we get fifty calls a day from each line we can work only sixty lines at a section. In practice we average the traffic of all our lines, lumping the one-call lines with the fifty-call lines, and say our average traffic is ten calls or twelve calls or whatever it may be, and our sections must be for three hundred or two hundred and fifty lines each, and so we arrive at an apparent equality of equipment for each line. But in each of those sections we have one-call lines and fifty-call lines working side by side, and we know that it is the fifty-call man who calls the tune while the one-call man pays the piper; because if it were not for the presence of the fifty-call man the one-call man could get along with much less exchange equipment than he has to have in order to keep company with the busy line and help to equalize the load.

From this it is evident that the line with a small amount of traffic is obliged to support a certain quantity of exchange equipment in excess of its individual demand by reason of the presence of the heavy traffic line, and to a certain extent this bears out the average method of arriving at the equipment per line. But it must be borne in mind that the extra equipment is entirely due to the presence of the heavy traffic line and to the exigencies of telephone exchange working; the small traffic line, although its exchange equipment has to be extended for the accommodation of other lines, does actually make a smaller demand on the exchange equipment as a whole because a section or a position can accommodate a greater number of low traffic lines than it can of high traffic lines. Therefore, it is plainly inconsistent with the facts to consider the exchange equipment as averaging the same for all lines, and the unit of exchange equipment, as ordinarily taken, is as illusory and inaccurate as almost any other average figure in telephone work. The traffic is obviously the determining factor and the traffic of each individual line largely determines the amount of central office equipment required for that line. If there were no multiple boards, and each line were operated individually the central office expenses per line would vary almost in direct proportion to the traffic per line, but the multiple board compels the low traffic line to carry equipment that is called into existence by the demand for space for the high traffic line. While it is clear that with multiple boards the equipment of a low traffic line cannot be restricted to exactly what is necessary for the operation of that line, it is equally clear that the presence of the low traffic line helps to keep down the total amount of equipment.

NEW LIFE FOR PACIFIC COAST INDEPENDENTS

COMPARATIVELY few people in the East and Middle West are aware that Portland, Oregon has had an Independent telephone exchange for the last eight years. This is the Columbia Telephone Company.

This company was, however, bought out by the Bell licensee for Oregon on January 12, thus leaving the field, for the present at least, under control of the Bell. That this will only be a temporary hardship for the residents of Portland and that the Bell has only taken a "white elephant" on its hands, is clearly shown by the following communication from Mr. F. H. Stow, late general manager of the Columbia Telephone Company to THE AMERICAN TELEPHONE JOURNAL:

"The same day that I resigned as general manager of the Columbia Telephone Company," says Mr. Stow, "I started to interest capital in another Independent company here, and I am pleased to say that I was very successful and that we now have our franchise before the city council. We shall start construction work as soon as the franchise is granted, which we confidently expect will be in April.

"The selling of the Columbia Telephone Company to the Bell interests, is not to be regretted, inasmuch as it clears up the field of an old company that was started on wrong principles, low rates and poor construction, and which could never have been successful.

"The Columbia Telephone Company was one of the pioneers in the Independent field. It was started in 1894, when little was known of what was necessary to make the business successful, and at a time when it was impossible to obtain anything like good apparatus."

In his letter of resignation as general manager of the Columbia Company to the District Manager of the Pacific States (Bell) Telephone and Telegraph Company, Mr. Stow shows up some Bell methods in dealing with the public, that are enlightening. It was as follows:

"Dear Sir: I herewith tender my resignation to take effect at once. This morning when I called upon you, you handed me a petition which was headed Columbia Telephone Co., and read as follows: 'We, the undersigned subscribers for telephone service in Portland, Ore., believe that there is no advantage in having two companies in operation, but on the contrary consider it an actual disadvantage involving much unnecessary expense and annoyance, and if the managers of the two companies can come to an agreement by which the Columbia Telephone Company's exchange can be consolidated with the Pacific States Telephone & Telegraph Company's exchange, it will meet with our approval.'

"You then told me that you wished me to circulate this petition among our leading subscribers and try to get their signatures, and asked me to represent that your company had an option on the Columbia Telephone Company, and that if our subscribers were willing we would sell to you. This is not a true statement of the affairs, as you and your representatives know, inasmuch as on January 12 you bought the Columbia Telephone Company and paid cash for it, and now your representative holds all the stock of this company.

"My reason for resigning is this, that personally and as the head of this company I have endeavored to be honest and above board with the public and our subscribers, and I now refuse to be your tool to carry out an underhand piece of business, which would make the public believe you were asking their permission to buy this plant, while in reality you care nothing what the public may think, and are simply trying to make a club to use against other companies opposing you.

"I sincerely believe in the future of the Independent telephone business, and all of our business men know that since the Columbia Telephone Company came into the field the rates have been much more just and the service better.

"Many of our leading business men have looked upon this company as good insurance against arbitrary treatment, and I most sincerely regret that its day of usefulness is now over.

"F. H. STOW."

Adolph A. Dekum, president of the Columbia Telephone Company for the past year, has also resigned and is not in any way connected with the statement embodied in the petition referred to in Mr. Stow's letter.

CONTEMPORARY CROSS TALK

By "The Listening Key."

FROM our discussion of the exchange equipment of large telephone systems it is evident that we cannot fairly and accurately determine a unit of exchange equipment per line. The tangible unit is, of course, the answering jack, but we have seen, on looking beyond the answering jack, that the number of answering jacks that can be put into an exchange, and the number of switchboard sections and other apparatus that will be required for the accommodation of those answering jacks, depend on the aggregate traffic of all the lines to be worked at the exchange. As the traffic of the different lines varies widely, the unit represented by the answering jack will be merely an average figure, and will represent nothing more than the total cost of the equipment divided by the total number of lines which it is intended to operate. We know, however, that a figure arrived at in that way does not represent the true state of affairs, for it makes all lines cost alike, whereas it is clear that the low-traffic line requires less exchange equipment and costs less on that score than the high-traffic line. Therefore, to take the answering jack as the unit simply perpetuates the old error of following averages that has so long kept the telephone business in a rut.

Traffic is the Key

The traffic is really the key to the situation, and the central office equipment for each line is really dependent on the amount of daily traffic done over that line. Every daily message has its bearing on the size of the exchange. If each message earns its corresponding share of revenue and pays its share of exchange expense there is no need to worry about a unit of exchange equipment per line. The exchange being designed to carry traffic it is the handling of traffic that is the important point, not the arrangement of the lines in the switchboard. Each unit of switchboard, position or section, which ever you choose to take as the unit, can handle a certain amount of traffic in a day. Broadly speaking, it is immaterial to the message-rate manager whether he puts ten lines or a hundred lines at a position so long as he works the position economically and efficiently with regard to the total amount of daily traffic it deals with. The object of the message-rate manager is to get say, a thousand calls a day handled at each position; if it suited him to put ten lines, each originating a hundred calls a day, at one position, and one hundred lines, each originating ten calls a day, at another, he could do so with a light heart, because each message pays him its proper share of exchange expense.

He Does Not Do This

As a matter of fact he does not actually distribute his lines in that unequal fashion, for various reasons connected with the peculiarities of telephone subscribers and operators and traffic, but theoretically speaking he could afford to go to the extreme of putting but one line at a position if a line were capable of supplying sufficient traffic to keep a position busy. Or he could go to the other extreme of putting a thousand lines at a position if those thousand lines gave only enough daily traffic to occupy the position properly. The aggregate daily traffic at the position is what counts. As a matter of practice, in order to equalize the load as much as possible during the different hours of the day and to prevent the operator from being overwhelmed during rush periods, it is naturally best to place at each position lines of all classes, some high-traffic, some low-traffic and some medium, so that the extremes theoretically possible are never actually indulged in. The actual arrangement works out at an average of so many lines per position, but the governing factor is the amount of daily traffic per position.

How it Works in Practice

For example, the message-rate manager may find that the aggregate traffic from a given number of lines is going up. Assuming that he has got his operating efficiency up to the topmost notch, and cannot handle a larger amount of traffic per position than he is actually handling, he then has to increase the number of positions and reduce the number of lines at each position. The same number of lines are now using more central office plant and space than they did before, each line calls for more material and more space, those whose traffic has not increased along with those whose increased traffic has brought about the enlargement of the plant. But the message-rate manager does not repine on that account. His unit is not the line, but the message. He is handling more messages, which are bringing him in more money, each message bravely and honestly paying its way, and he can afford to increase his plant indefinitely so long as he keeps the cost of handling the message at the proper ratio below the price it brings in. To the message rate manager a line is not a unit until it has reached its maximum traffic-carrying capacity. What the maximum capacity of a subscriber's line in daily traffic may be put at is an interesting question which we will not discuss just now.

The Flat Rate Manager's View

How differently does the flat rate manager view these questions of units and traffic! He, poor devil, is tied to a unit which is no unit, which is based on a set of averages and may mean one thing to-day and another thing to-morrow or next year. At the exchange he is forced to take the answering jack and line as the unit, and to base his calculations on what is, as we have seen, a very variable quantity. He calculates that he can accommodate so many subscribers' lines at a switchboard of a given size, assuming a certain average traffic per line, and he says each subscriber's share of exchange plant costs him so much. If the traffic goes much beyond the assumed figure he soon finds that the switchboard will not properly accommodate the number of lines estimated. He then either has to enlarge the switchboard, which upsets his figure for cost of exchange plant per subscriber, or to overload the positions, which upsets both the operators and the subscribers and spoils the service. In a flat rate system of any size the increase of traffic is apt to be very large and very general, and the expense and embarrassment arising from a rapid and well-sustained increase are serious troubles for the flat rate manager to face.

Only One Tangible Unit

It stands to reason that if business calculations are based on units which are not fixed units but are liable to change, and on averages which are mere guesswork, the results will often be unfortunate for the business. So far as we have gone we have found only one really tangible unit—the subscriber's set of instruments. At the exchange we find that there is no really fixed unit, and that the practical unit—the switchboard section or position—is a measure of traffic and not of lines. We find that the amount of equipment required for each line depends partly on the traffic of that line and partly, owing to the reciprocal nature of telephony, on the traffic of the other lines with which it is assembled into an exchange. Under these circumstances there can be no fixed unit of exchange plant in relation to a line. The amount of exchange plant is regulated by the aggregate traffic of the exchange, and the exchange plant of each line is dependent on the aggregate traffic of the exchange. But of traffic the flat rate manager takes no account. At the beginning he assumes an average figure, the actual traffic of his system may at first not exceed his average figure, but it may easily before long exceed it very largely.

Disadvantages of Flat Rate

Then there is trouble manifest for the flat rate manager. He finds that he has relied on units that are no units, but variable quantities, and on averages that do not remain stationary. He has agreed to supply a certain amount of plant and service for a fixed sum, reckoning on a profit. His customers continue to proffer the fixed sum, but demand a steadily increasing amount of plant and a steadily increasing amount of service, and he sees the margin of profit rapidly disappearing. Certain assistance comes to him from improvements in methods and apparatus, which enable him to do work at a cheaper rate, but these are merely temporary aids, and do not cure the radical unsoundness of the position, which is the reliance on units that are not units. In the subscriber's station equipment we have found a real unit, and we have observed that any variation on that unit is accompanied by its corresponding variation in rate. In the exchange we have seen that there is no real unit of plant, except as determined by the traffic, and that only when the revenue is proportional to the traffic is this a commercially sound proposition. We now can proceed to consider the line plant.

A FEW IOWA COMPARISONS

IOWA Independents have just realized their strength, since they have been trying to get into Council Bluffs. They have been gathering figures and facts and statistics that are remarkable. These statistics show that the telephone situation in Iowa is absolutely controlled by the Independents. Here are some comparisons recently tabulated:

In Harrison County, where the Woodbine Telephone Company operates, there are 62 miles of Independent lines, 52 of Bell lines, 9 Independent toll stations, 7 Bell toll stations, 3 Independent exchanges, no Bell exchanges, 550 Independent subscribers, and not a subscriber to a Bell telephone.

The comparison in the territory covered by the Harlan and Avoca Telephone Company is even stronger. It shows that in Harlan the Independent company has 331 subscribers, against 5 of the Bell; it has 51 rural connections; the Bell has none. In Avoca there are 184 Independent subscribers and 49 rural connections, against 6 Bell subscribers and no rural connections. In Oakland the Independent company has 139 subscribers, and in Carson, 165. The Bell company has no subscribers in these towns.

The Independent company in Hancock operates 66 telephones, and the Bell company none.

The Crawford County company has lines in all except four towns in Crawford County. It is now building to two of these, and has connection with the other two. In the principal cities in this territory the comparison is: Defiance, 72 Independent, no Bell; Carroll, 350 Independent, 150 Bell; Vail, 100 Independent, no Bell.

The Creston Mutual Telephone Company thoroughly covers Creston County and has connections over nine metallic toll lines to every point within a radius of fifty miles. The following are comparisons of the number of Independent and Bell subscribers in the territory reached by the Creston Mutual: Creston, 630 Independent, 15 Bell; Afton, 105 Independent, no Bell; Murray, 88 Independent, no Bell; Larimor, 46 Independent no Bell; Osceola, 162 Independent, no Bell; Chariton, 250 Independent, no Bell; Indianola, 240 Independent, 120 Bell; Winterset, 220 Independent, 75 Bell; Des Moines, 2,400 Independent, 1,800 Bell; Greenfield, 120 Independent, no Bell; Stuart, 117 Independent, no Bell; Corning, 300 Independent, 25 Bell; Red Oak, 300 Independent, 300 Bell; Villisea, 15 Independent, 60 Bell; Mt. Ayr, 100 Independent, 5 Bell; Lenox, 74 Independent, no Bell; Gravity, 45 Independent, no Bell; Conway, 25 Independent, no Bell; Maryville, 425 Independent, no Bell; Hopkins, 200 Independent, no Bell; Bedford, 225 Independent, 75 Bell; and Shannon, 34 Independent and no Bell.

Queries

Conducted By WILLIAM W. DEAN

PRINCIPLE OF THE MULTIPLE ARC.

Please explain the principles of the multiple arc and its advantages when applied to the telephone? Please state how the bridging is applied, where applied, and why applied? Why is the instrument said to be bridged onto the line?—W. A. B.

Houston's Electrical dictionary gives the following definition of multiple arc. "A compound circuit in which a number of separate sources or separate electro-receptive devices, or both, have all their positive poles connected to a single positive lead or conductor, and all their negative poles to a single negative lead or conductor."

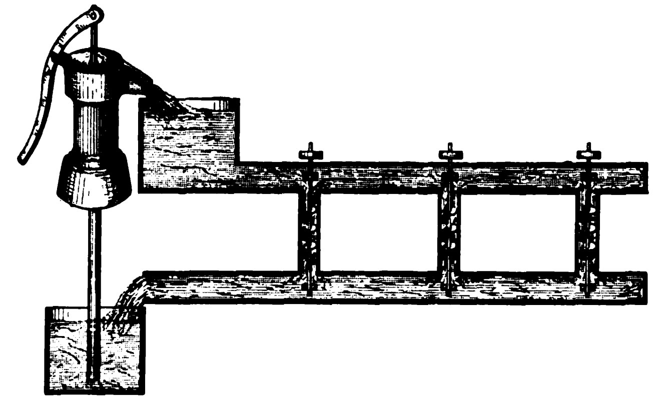


FIG. 1.

Figs. 1 and 2 illustrate in a simple manner the difference between a multiple and a series circuit. In order to present this problem in a simple manner three small water wheels have been shown in each case, the ones in Fig. 1 being driven in multiple and those in Fig. 2 in series.

Referring to Fig. 1, the water in the upper or supply pipe subdivides and a third of it flows through each of the wheels, thence to the lower or return pipe back to the receiving tank where it is pumped up to the upper or pressure tank. The pump in this illustration would be equivalent to a dynamo in a central station. In Fig. 1, the water supply can be cut off on either of the three wheels, without affecting the other two. In Fig. 2, a series arrangement of the wheels is shown, and the water must flow consecutively through all of the wheels so that if the supply were stopped on any of the wheels, it would stop the flow through the whole system. The only way the water could be shut off from one of these wheels without affecting the others, would be by forming a path around the wheel for it, or in other words, short circuiting it.

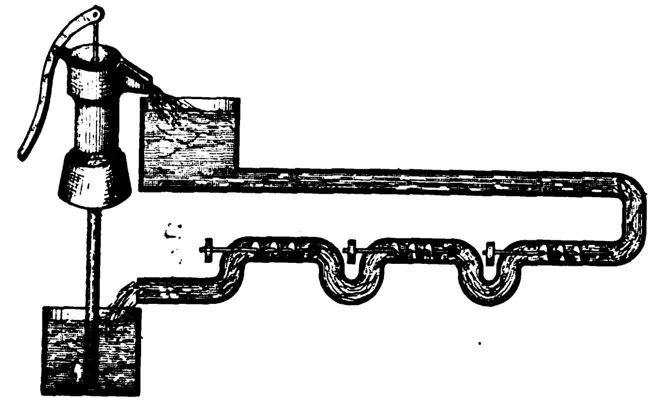


FIG. 2.

The arrangement shown in figure 2 would require water at a much higher pressure inasmuch as it has to overcome the friction of three wheels in series, and the arrangement shown in Fig. 1, although it does not require the water to be of such high pressure, requires a very much greater volume. In Figs. 3 and 4 a standard series and bridging telephone connection is illustrated. In Fig. 3, the two end subscribers while conversing would have to talk through the winding of the 80 ohm ringer. It is a well known fact that when alternating currents are passed through a coil wound upon an iron core, that this coil offers a very much higher resistance than that represented by its ohmic resistance. This phenomenon is what is known as "impedance." I have measured the impedance of an 80 ohm ringer and found that at telephonic frequencies it is approximately equal to 50,000 ohms. It will thus be seen that the two end subscribers in Fig. 3 are obliged to talk through 50,000 ohms actual resistance. It is evident that the series arrangement of telephones should never be used where more than two telephones are on the line. In Fig. 4, the standard arrangement of what is known as the bridging line is shown. In this arrangement the two end subscribers are talking past the one thousand ohm coil which is bridged directly across the line. It is apparent that in this case the phenomena of impedance comes to our aid, inasmuch as we are obliged to talk past this coil; the higher resistance it offers, the less talking current will be lost through it. It is customary to wind a bridging bell to 1,000 ohms, not so much to gain in resistance as to gain in the number of convolutions or turns about the iron core. Ordinarily a 1,000 ohm ringer has about four times as many turns as an eighty ohm ringer, and consequently should have about sixteen times as much impedance; as a matter of fact on account of magnetic leakage, this actual impedance is only about ten or twelve times; in other words, it has an impedance to telephonic currents of about 500,000 ohms. You will thus see that the loss through this coil is infinitesimal.

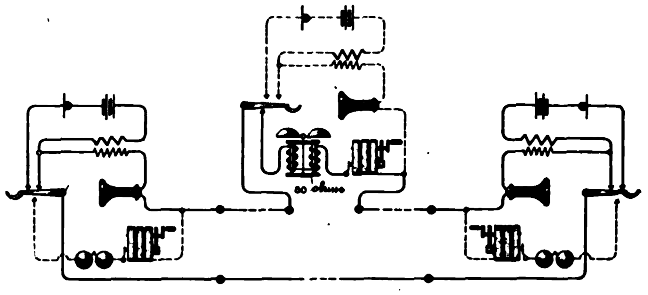


FIG. 3.

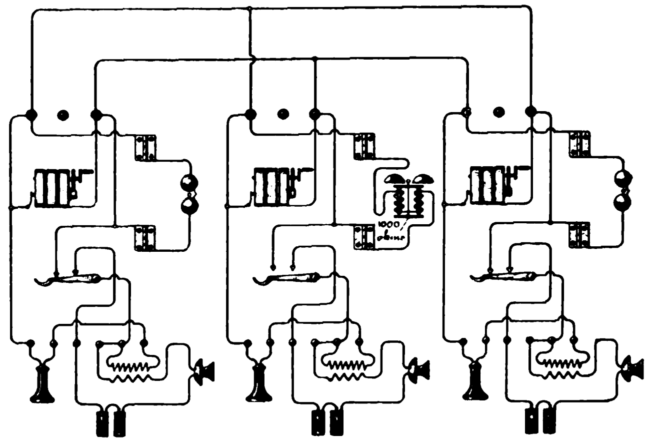


FIG. 4.

INSULATION.

If running a long grounded line close to a short grounded line might cause a leak from long to short line, would using weather-proof insulated wire on the long line that distance prevent the trouble? T. F. C.

—No. It is absolutely unnecessary to use insulated wire where ordinary insulations are used on the pins.

TELEPHONE EXCHANGE ENGINEERING—ARTICLE VI

By Ray H. Manson, Albion D. T. Libby and Charles A. Simpson.

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Guarantee and Inspection: The contractor fully warrants to the telephone company the workmanship and material of the apparatus covered by the specifications, and agrees to replace, within one year from the completion of the installation, any part showing inherent defects. It is also agreed that all materials supplied and labor performed shall be subject to the inspection of the engineers of the telephone company, and the contractor agrees that he will correct, at his own expense, all work which does not fully comply with the specifications.

Risk: Any damage or loss occurring to any of the property necessary for, or used in the installation of the plant, whether caused by the fault or carelessness of the contractor or his employees, by theft, fire, water, or in any other way, before the entire work is formally accepted by the telephone company, shall be made good at the contractor's own expense, and in a manner satisfactory to the engineers of the telephone company.

Disputes: All disputes arising from the nature of the work, whether as to materials or workmanship, shall be finally settled by the engineers of the telephone company upon the lines of the specifications.

Patents: The contractor hereby guarantees that the apparatus provided under this contract, with the appurtenances and attachments therewith, does not infringe any patent now issued and in force, and he shall defend the telephone company, at his own expense, against any and all suits and claims, said guarantee to remain in existence for all time; and he shall indemnify the telephone company for all damages and all costs of suits that may be assessed against it in such suits.

Time of Completion: The contractor agrees to have the installation completed and ready for service on ...., this date being considered an essential feature of the specifications.

A penalty of $.... per day, legal holidays and Sundays excepted, shall be paid by the contractor as indemnity to the telephone company for loss, for each and every day's delay beyond the stipulated time until the plant is completed and accepted by the engineers of the telephone company.

Future Equipment: The contractor agrees to furnish and install all additional equipment, as it may be required from time to time, at such base prices as are used for estimating the cost of the apparatus herein specified, or at the prices charged his most favored customer, as the telephone company may elect.

Terms: Wherever the term "telephone company" appears in these specifications it signifies the .... Telephone Company of ....

Wherever the term "engineers of the telephone company" appears, it signifies the engineers or person in charge of the technical affairs of the .... Telephone Company.

Wherever the term "contractor" occurs, it signifies the bidder who has been awarded the contract to do the work as set forth in these specifications.

Proposals: Sealed proposals, stating in detail what the bidder proposes to furnish under these specifications, and the cost of same, shall be in the hands of the telephone company on or before .... The telephone company reserves the right to reject any or all bids submitted.

Editor's Note.—The first article in this series appeared in the issue of November 22. They will continue many months.

Patents

MAGNETO TELEPHONE ATTACHMENT.

Jacob Riedinger, of Oberlin, O., patents (No. 723,309) a telephone attachment. The object of this device is to enable the subscriber to signal the operator for connection or disconnection merely by raising the receiver from the hook or by replacing it thereon. The details of the arrangement are shown in Figs. 1 to 4, inclusive.

FIG. 2

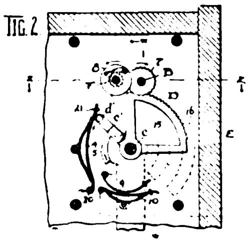


FIG. 3

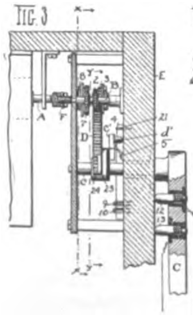


FIG. 4

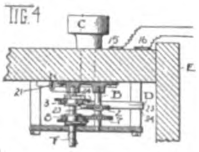
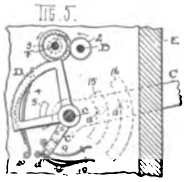


FIG. 5



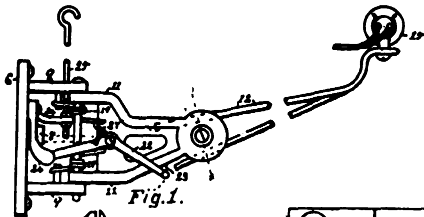
The receiver C^2 is fastened to an arm C^1 this arm being attached to arm C, the latter being connected to shaft c, which extends through the side of the box containing the generator, transmitter and bell. To this shaft c is fastened a segment D, which is arranged to engage with gear 2 and pinion 3, which are mounted on shafts B and F, respectively. Shaft B also carries gear 7 and shaft F pinion 8. Pinions 3 and 8 are mounted free on the shaft F and provided with pawl and ratchet mechanism as shown, so as to cause the shaft F to rotate according as they are used. Shaft F is rigidly connected, as shown in the figure, with shaft A of the magneto generator. The operation of raising the receiver to the level of the ear rotates the segment D and carries it to engagement with and rotates successively gear 2 and pinion 3; this also causes gear 7 to engage with and rotate pinion 8. The pawl and ratchet attachments to pinions 3 and 8 are arranged so that one pinion rides free on the shaft when the other engages with it, consequently one pinion rotates the shaft during an upward movement of segment D and the other pinion controls the rotation during a downward movement of the segment, thus insuring that the rotation of the shaft F, and consequently of the shaft A, shall always be in the same direction. Arm C carries two contact points 12 and 13, which, when the receiver is raised into position for use make contact with the metal strips 15 and 16, which are mounted on the side of the box.

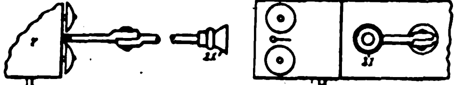
These strips serve to connect the receiver into the line. The shaft c carries an arm c^1 which carries at its extremity a pin d^1, as the receiver is raised or lowered the arm c^1 revolves with the shaft c, the pin d^1 makes contact with the spring 4 and connects it through the arm c^1 with the plate 5, the spring 4 and the plate 5 being in the magneto circuit and when connected together serving to connect the generator to the line. When the receiver has been raised to the position for use, the arm c^1 and the pin d^1 have been brought into the position shown in Fig. 5 and the springs 9 and 10 are connected together by means of the pin d^1. The springs are wired in the transmitter circuit, and their connection serves to close that circuit.

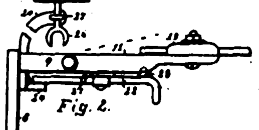
RECEIVER SUPPORT.

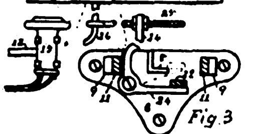
Frank J. Becker, of Hamilton, O., patents (No. 723,635) an adjustable support for telephone receivers. The support, which is shown in Figs. 1 to 5, is arranged to be fastened by means of a bracket to the wall adjacent to the telephone box, and is intended to carry the receiver at all times, the movement of the support operating the hook switch of the telephone and opening and closing the circuit. The receiver is held in position at the end of the arm 12 by means of the spring clips shown. The length of the arm can be adjusted by sliding the portion 12 through the grooves of the cap.

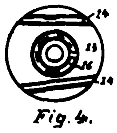
The receiver support 11 is hinged, as shown, between the horizontal lugs 9, and springs 19 are provided, which tend to keep the receiver arm in a position represented by the dotted lines in Fig. 2, which is a plan view of the device. A latch 22 is pivoted to the receiver support, as shown, this latch engaging with a bell crank lever 24 when the telephone is not in use. The bell crank lever is fastened to a rod 25, which is connected to the hook switch, and during the time that the latch 22 engages the lever 24 the rod 25 holds down the hook switch and keeps open the circuit.

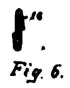


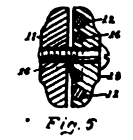












When the receiver is moved in a lateral direction by the pressure of the operator's ear, latch 22 is disengaged from the bell crank lever, and the spring in the hook switch raises rod 25 and closes the circuit in the usual manner. When the pressure is withdrawn from the receiver the arm, actuated by springs 19, again takes up the position shown by the dotted lines, and the latch 22, engaging the lever 24, opens the circuit. The circuit can, however, be kept permanently closed regardless of the position of the receiver support by moving the latch 22 into engagement with catch 8, as shown by the dotted lines in Figs. 1 and 3.

RECEIVER SUPPORT.

Daniel W. Shiek, of Chicago, Ill., patents (No. 723,742) a support for telephone receivers. The object of this device, which is shown in Fig. 1, is to provide a receiver support which will hold the receiver and at the same time open and close the circuit as a result of a slight movement of the head on the part of the operator. In the drawing A represents a plate adapted to be fastened to a wall or board. This plate is provided with arms a constructed so as to support the parts, as shown. B is an arm supported between the arms a a by means of the pin C, and is provided with a coiled spring D, which has one end d extended to a point in the path of the movement of the support B, and the other end d extended in the path of and engaging with the lever F, which is pivoted on the rod C. G is a bell crank lever, provided with an arm g extending downward and an arm g^1 extending out, and engaging with a rod I, which is fastened to the hook switch of the telephone. E is a loose lever which rotates freely around the pin C, having one end adapted to loosely engage the end d of the spring D and having the outer end constructed to engage the rod H, as shown in Fig. 2. The rod H is connected to the end of the arm g of the bell crank lever. The receiver is held by the clamp L^1 fastened to the end of the arm L. When the operator using the telephone places his ear against the receiver and exerts thereon a lateral pressure, the arm B moves against the pressure of the end d of the spring D, taking the end d out of engagement with the lever E and allowing the springs in the hook switch to raise the switch, the rod I, the arm g^1 of the bell crank lever, and at the same time closing the telephone circuit. Upon completion of the conversation the operator leaves the telephone, and the spring D moves the arm B into its normal position, thus bringing the end of the spring d in contact with the lever E, which in turn moves the rod H and through it depresses the arm g^1 of the bell crank lever G, which, pushing against the stop i on the rod I, presses down the hook switch contact and opens the circuit. The lever F serves to check any tendency to a too violent return of the receiver support to its normal position, due to any sudden departure of the operator from the telephone. Where it is desirable to keep the circuit closed for a short time, when the operator is not at the telephone, a pin O, shown in Fig. 1, is provided, which can be raised to contact with lever F and hold the parts in position for conversation.

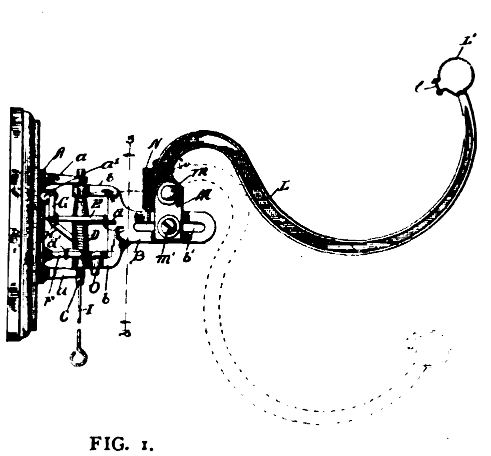


FIG. 1.

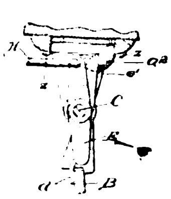
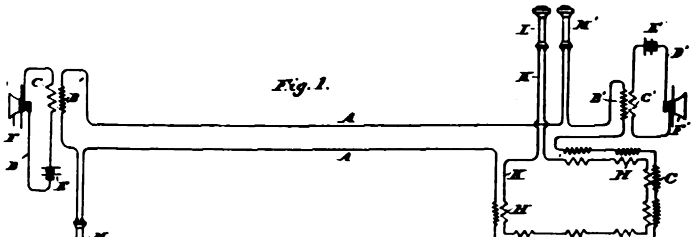


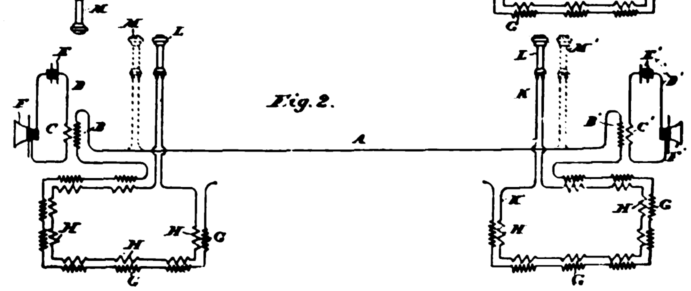
FIG. 2.

TELEPHONE APPARATUS.

Charles G. Burke, of Brooklyn, N. Y., patents (No. 12,103) a telephone system the details of which are shown in Figs. 1 and 2.

The ordinary magneto transmitter F^1 induction coil B^1 C^1 and local battery E is used at each end of the line for the transmitting apparatus, and a receiver M^1 is connected in series in the line at each station in the usual manner. The secondary B of the induction coil is also connected in series in the line, as is usually done, and in addition are connected in series, the primary windings G of a number of other induction coils, as shown in the figures. Associated with each one of these windings is a secondary winding.





These secondaries are connected in series and have a receiver included with them, thus forming a closed circuit. Fig. 1 shows this arrangement applied to one end of the line; the other end of the line is considered as being equipped in the same manner, but for the sake of simplicity is not so shown. The inventor claims that the use of these induction coils increases both the loudness and distinctness of the transmission.

Fig. 2 shows this system applied to a line consisting of a single ungrounded conductor, using the induction coils and closed secondary circuit, as shown.

The Week's Messages.

FINANCIAL.

GREELEY, COLO.—The Morgan County Independent Telephone Company stockholders have voted an issue of bonds for $50,000 of the company for building extensions in northern Colorado, and a double copper circuit between Fort Morgan and Greeley, and connecting all intermediate points.

METAMORA, ILL.—The Metamora Telephone Company has increased its capital from $280 to $1,200; number of directors decreased from seven to five.

ROCKFORD, ILL.—The Winnebago County Telephone Company, of Rockford, has increased its capital stock from $5,000 to $25,000, and the number of directors from five to seven.

BLAÇK RIVER, N. Y.—The Black River Telephone Company, with a capital of $50,000, of which T. B. Basselin is president, S. C. Capron secretary and Charles W. Pratt treasurer, has issued $25,000 worth of bonds.

FRANCHISES.

AZUSA, CAL.—An application for a telephone franchise here has been made by the Home Telephone Company of Covina.

LOS ANGELES, CAL.—The Pomona Valley Telephone and Telegraph Company has filed with the supervisors an application for a franchise permitting it to establish a telephone line between Claremont, Spadra and other points in the Pomona Valley.

BRAIDWOOD, ILL.—The Inter-State Telephone Company has been granted a franchise here.

QUINCY, ILL.—The aldermen of Quincy have decided in favor of giving a telephone franchise to F. L. Bill, and an ordinance to this effect will be adopted.

WINTHROP, IA.—The Winthrop Telephone Company has asked for a franchise to operate a local system.

BROCKTON, MASS.—The New Bedford and Fall River Automatic Telephone Company, operating in New Bedford and Fall River, will ask for a franchise here. Benjamin F. Waters is interested in the company.

STILLWATER, MINN.—The Consolidated Telephone and Telegraph Company has asked for a franchise here for long distance service. It also promises to install a local exchange if the city desires any time after November 1, 1904.

HOLDREDGE, NEB.—The city council has voted to F. W. Barber and C. W. Stiger a telephone franchise, permitting them to construct and operate a telephone exchange within the city and to conduct a long-distance toll line in and out of Holdredge.

McCOMB, OHIO.—The Mutual Telephone Company has secured a franchise from the town council and will build a line in and about the town at once.

TUNKHANNOCK, PA.—The Tunkhannock and Wyoming Valley Telephone Company is seeking an entrance into Laceyville.

LESTERVILLE, S. DAK.—The town board of this place has granted to the Farmers' Exchange Company of Tyndall a franchise to put in a local telephone exchange. When the local exchange is established it is the purpose of the company to extend a line to Yankton.

PLANKINTON, S. DAK.—The city council has granted to N. H. Berens, of this city, a franchise to construct and operate a local telephone system. Mr. Berens represents a stock company, composed of thirteen leading business men.

PARK FALLS, WIS.—A twenty-year franchise has been granted to the Park Falls Telephone Company for a local and long-distance telephone system, which it is expected will be extended from Park Falls to Phillips and Mellen.

HOYT, KAN.—Hoyt has severed its connection with the Bell Telephone Company and connected with the Independent company. This system, which includes over one hundred telephones, was installed not more than a year ago, the Bell company putting in the switchboards, transmitters and receivers.

COMPETITION.

TOPEKA, KAN.—The Bell telephones at the State Insane Asylum and four other State offices have been taken out and Independent telephones substituted.

UNIONTOWN, PA.—The officials of Fayette county have voted unanimously to do away with the Bell telephones and use only the Tri-State.

COMBINATIONS.

NEW CASTLE, IND.—At a recent meeting of a number of farmers and business men interested in the various telephone companies it was determined to incorporate these companies into the Sulphur Springs Co-operative Telephone Company, with lines extending into Prairie, Fall Creek and Harrison townships. The articles of association were signed by about eighty persons, and the following were elected directors of the new company: R. H. Mann, Henry Fadely, S. Hayes, Joseph McWilliams, Jonathan Huffman, D. F. Hoover, Asa Maddy, John McSherly and George Flemming.

MORNING SUN, IOWA.—The Yarmouth Telephone Company, which recently was refused a franchise by the town council of Morning Sun, got around the obstacle by buying out the Morning Sun exchange completely.

SIOUX CITY, IOWA.—The Maple Valley Telephone Company has absorbed the Peiro Telephone Company, which extends from Oto to Hornick, passing through the towns of Peiro, Climbing Hill and Holly.

ALLEN, KAN.—The Swenson and Troutman Telephone companies have consolidated and will use one switchboard. Paul Troutman is constructing a line between Allen and Americus, and has a franchise to build in Americus.

LONDON, KY.—The London telephone exchange has been sold by N. Starkey to J. W. Creech, of East Bernstadt, and others for $10,000. Mr. Starkey will go to Pineville to manage the exchange at that place, which he recently acquired.

OWENSBORO, KY.—J. W. Chambers, of Winchester, principal owner of the Winchester and Mt. Sterling Home Telephone exchange, was here recently looking over the plant of the Owensboro Home Telephone Company with a view to purchasing it.

MANCHESTER, N. H.—The Citizens' Telephone Company has arranged to add the Canterbury Telephone Company's lines to its system, and will continue the line, which is to be built this summer from Tilton to Bean Hill, in Northfield, to Shaker village, where connections will be made with the Canterbury line.

OTTAWA, OHIO.—The assets of the insolvent Columbia Telephone Company's plant, located here, have been sold to the Williams-Abbott Electric Company, of Cleveland, as per order of Judge Wing, of the federal district court, at one-half its appraised value. The assets amount to $40,196.77, while the liabilities were nearly as much.

WASHINGTON, PA.—The West Penn Telephone Company, operating between Washington and Burgettstown, McDonald and Pittsburg, has been sold by the receiver, John M. Dunn, to a new company, called the Chartiers Telephone Company, for $20,225. The company had 115 miles of lines in Washington and Allegheny counties, and Brooke county, W. Va., with exchanges at Independence, Buffalo, Patterson's Mills, Cross Creek, Claysville, West Middletown, Taylorstown and Oakdale, Pa.; Bethany and Midway, W. Va., and Burgettstown and McDonald, Pa. The new company was organized for the purpose of taking over the defunct company, and will rebuild the old lines and make extensive improvements in the service. The officers of the company are Richards Gladden, J. P. Linn, W. L. Scott, J. B. Painter and J. E. Perrin, all of McDonald, Pa.

GREENEVILLE, TENN.—A meeting of the owners of Independent telephone lines in Greene county was held here recently. There are about forty of these Independent lines in the county, owning in all about 500 miles of wire and 500 telephones. A committee was appointed to ascertain how many of the Independent lines could be combined, and also the expenses incident to the establishment of a central station in Greenville.

FRANKLIN, TEX.—W. T. Pittman has purchased the local telephone exchange from Messrs. Bell and Jones.

THE WEEK'S MESSAGES—Continued

GREENVILLE, TEX.—The property and business of the Greenville Telephone Company has been transferred to Ed. L. Glendon, of Pittsfield, Ill., trustee for the Home Telephone Company. The charter for the latter company has been filed at Austin, some of the incorporators being C. B. Jones, T. J. Young and G. S. Perkins, of this city, and Ed. L. Glendon and L. A. Chamberlain, of Pittsfield, Ill. The new company is capitalized at $100,000, and proposes to enlarge and improve the local exchange and extend long distance connections.

ELECTIONS.

DUBLIN, GA.—Clark Grier has sold his interest in the Macon and Dublin Telephone Company to Herman Branch, of Macon. New officers have been elected as follows: President, A. Davis; general managers, F. F. Scarborough, Herman Branch. The line will be greatly improved in the near future.

HARPER, IOWA.—The Harper Mutual Telephone Company, No. 3, has elected William Snakenburg president, A. Dubois vice-president, Ed. Lures secretary and A. Hoffman treasurer.

RED OAK, IOWA.—The annual meeting of the Montgomery County Telephone Company was held in the office of the company. A very satisfactory semi-annual dividend was declared. S. G. Hersman, C. H. Brown, of Grinnell; C. F. Clarke, A. C. Hinchman and J. F. Miller were elected as the board of directors for the ensuing year.

ALMA, MICH.—At the annual meeting of the stockholders of the Union Telephone Company, the old directors were re-elected as follows: J. H. Fildew, J. T. Millman, C. T. Babcock, Thomas Bromley, Jr., of St. Johns; S. E. Parkill, C. W. Gale, of Owosso; Tod Kincaid, of Corunna; J. W. Robinson, of Vestaburg; W. O. Mason, of Merrill; G. S. Ward, of Alma; J. P. Gibbs, of Ithaca; C. H. Laflamboy, of McBrides. Stanley E. Parkill, of Owosso, was re-elected president, J. H. Fildew secretary and G. S. Ward treasurer. John Fildew continues as general manager.

EDGERTON, MINN.—The annual meeting of the stockholders of the Enterprise Telephone Company was held here recently and these officers elected: Ed. Yocom, president; R. B. Hinkley, vice-president; F. F. Burdett, secretary; F. E. Douty, treasurer, who with E. W. Davies, William Lockwood and C. S. Howard constitute the board of directors.

WINONA, MINN.—The annual meeting of the Inter-State Telephone Company was held at La Crosse, at which the following officers were elected: President, Hon. James A. Tawney; vice-president, John Dietze; secretary and treasurer, Otto Troost, Jr.; directors, J. R. Mitchell, James A. Tawney, John Dietze, E. K. Tarbell and Edward Lees.

TRIANGLE, N. Y.—The Triangle and Whitney's Point Telephone Company has elected Bert Courtright vice-president and D. W. Beardsley treasurer.

UNDERGROUND

FARMINGTON, CONN.—R. L. Andrews, of the Farmington Valley Telephone Company, will have about two miles of subway built in Hudson, N. Y., where the lines of his company run.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company has asked to build conduits on certain streets.

MISCELLANEOUS

NEW ALBANY, IND.—The Cumberland Telephone Company has finally granted the ninety men on strike an increase in wages.

COFFEYVILLE, KAN.—The Coffeyville Telephone Company has arranged with the Heckman & Perkins Company, of Independence, for interchange of business.

McPHERSON, KAN.—The farmers' telephone scheme in Turkey Creek and King City township is rapidly assuming a tangible shape. Mr. Wright, manager of the McPherson Telephone exchange, made the new company a fair proposal, and it is very likely that this will be accepted.

NEVADA, MO.—Theodore Gary, of Macon, superintendent of the Nevada Telephone Company, extending to a number of Southwest Missouri towns, has contracted with the Kansas City Home Telephone Company for connection with Kansas City.

MADISON, WIS.—The Badger State Long Distance Telephone Company, of Milwaukee, by Will G. Whitehead, president, and Frank M. Fish, secretary, filed an amendment with the Secretary of State here changing the location to Janesville, and decreasing the number of members of the board of directors from eleven to five.

PERSONAL

TEXARKANA, ARK.—The late manager of the Texarkana Telephone Company, Mr. Eubanks, has been promoted to a position on the road, where he will represent the company's interest. His successor is H. A. Brinkerhoff, who is well known as an expert in his line.

CRAWFORDSVILLE, IND.—John Coffey, of Romney, has been selected as manager of the Home Telephone Company.

GALESBURG, ILL.—F. Ashe, manager of the Galesburg Union Telephone Company, has accepted a position with Jones & Winter, contractors, of Chicago. Mr. Ashe will be succeeded by J. E. McMeen, of Chicago.

ELMIRA, N. Y.—It is rumored that Martin H. Murphy will shortly resign the office of city clerk and become local manager of the Elmira Telephone Company.

BOWLING GREEN, OHIO.—O. F. French, assistant general manager of the Federal Telephone Company, and Irvin W. Pope, engineer for the same company, both of Cleveland, are here looking over the local branch, the Wood County Telephone Company. Mr. Pope will have charge of the same as successor of Manager James.

WILKESBARRE, PA.—James F. Boyle is now local superintendent for the People's Telephone Company, succeeding Willard Felts, who has been assigned to other duties for the company in Pittston.

TEMPLE, TEX.—Wm. McLaughlin, former manager of the Independent Telephone Company, has been returned to Temple as local manager.

New Construction in the Field

APPLING, GA.—The Harlem and Appling Telephone Company has extended its lines to Bohler. It is expected that a line will be erected to Hazen and another to Thomson.

TIPTON, IND.—Joseph A. Glass, who is to establish a telephone system at Windfall, has begun work on the exchange there. He will also build a long-distance line from Windfall to Hobbs, to connect with the New Telephone Company.

BELOIT, KAN.—The Solomon Valley Telephone Company will build new party lines from Beloit to Joe Wear, Salt Creek township; Sunflower, Center township; Shadowen, Lulu township; Barnwell, Asherville township. There will be something like two hundred farmers added to the exchange when this work is finished.

BURDETT, KAN.—Guy Mather is installing a small number of private telephones here, which are a great convenience. Burdett is furnished toll-line service over the Larned Telephone Company's line.

BURLINGAME, KAN.—The farmers who live northeast of here are constructing a telephone system. G. W. Amos is at the head of the movement.

LARNED, KAN.—The Larned Telephone Company has just completed the installation of a new section of switchboard at its central office here. The Larned company will install about twenty-five new stations during the next month.

LYONS, KAN.—The Lyons Telephone Company has installed a new switchboard, which was necessitated by the recent growth of this company's business, as it operates several hundred miles of toll-trunk lines, as well as a large local exchange.

OVERBROOK, KAN.—The Overbrook Telephone Company is completing arrangements for putting in a long distance line between this place and Baldwin. A party line will be run along the same route.

TOPEKA, KAN.—The Independent Telephone Company, of this place, is extending and branching out over the county. Over forty men are now employed on the toll lines. Metallic circuits to Oakland, Sea Brook, Highland Park and Baryton have just been completed.

GRAND RAPIDS, MICH.—Additional extensions of its toll line system are to be made immediately by the Citizens' Telephone Company between Holland, St. Joseph and Benton Harbor. The line will cost between $15,000 and $20,000.

ROMEO, MICH.—The Home Telephone Company is planning to build a line to connect with the Oakland County Independent Company.

FULTON, MO. The Guthrie, Boydsville and Fulton Telephone Company will run a telephone line to White Cloud.

THE WEEK'S MESSAGES—Concluded.

LA BELLE, MO.—The farmers in this vicinity who are interested in the various telephone companies held a meeting recently and decided to establish an exchange here.

CARTHAGE, N. Y.—The Northwestern Telephone and Telegraph Company, of Carthage, is constructing a direct line to Philadelphia.

FILLMORE, N. Y.—The Fillmore Telephone Company expects to spend considerable money in extending its system.

URBANA, OHIO.—The Urbana Telephone Company has purchased a tract of ground 99 x 170 feet, and will use part of it for the erection of its new building.

BLOSSBURG, PA.—The Blossburg Telephone Company will soon equip its office with new switchboards and otherwise improve its service.

CRESSON, PA.—The Cambria County Telephone and Telegraph Company, with headquarters at Cresson, will spend $25,000 on new lines between Altoona, Cresson, Patton, Ebensburg and Johnstown.

INDIANA, Pa.—The Farmers' Telephone Company is rapidly providing an excellent service to the farmers of Indiana county. Within a few weeks the following lines will be ready for use: Cookport, Utah and Dixonville, Marion Center and Dixonville, Indiana and Dixonville, by way of Tacoma, and Penn Run and Dixonville, by way of Diamondville. When these are completed the line will be extended to Glen Campbell. Over 300 farmers now have telephones.

UNIONTOWN, PA.—The Tri-State Telephone Company has fitted up offices in the First National Bank building, and will there install the exchange. The company will spend about $50,000 in bettering the service between Uniontown and Connellsville. New directors have been elected as follows: R. E. Umbel, Nathaniel Ewing, Ira E. Partridge and F. H. Rosboro, of Uniontown, and Col. J. M. Reid, of Connellsville.

HOWARD, S. DAK.—C. E. Wisard, a local telephone expert, has been awarded the contracts to construct telephone systems at Wessington Springs, Iroquois and Kimball. Several other towns are negotiating with him for the construction of similar systems.

TAYLOR, TEX.—D. A. Walker, of Columbus, Ohio, general superintendent for the Independent telephone system in Texas, has been in Taylor inspecting the company's property here with a view to making considerable additions and improvement to both city and suburban service.

CUMBERLAND, W. VA.—The Cumberland Telephone Company has its new building nearly completed and will soon install a central-energy switchboard. All the circuits in the city are being put on a metallic basis.

INDIANA INDEPENDENT TELEPHONES

By H. S. O'Brien, *Special Correspondent.*

S. P. Sheerin, of the New Telephone Company, of Indianapolis, Ind., makes the prediction that in five years the telephones of the country will be regarded as second in importance of all the public utilities; that telephone communication will be further simplified and that in five years there will be 500,000 telephones in the State of Indiana. He says that it is a mathematical deduction, from figures actually at hand, that if there were the same telephone development all over Indiana that there is in the counties with the largest development, there would be at this time over 400,000 telephones in the State of Indiana.

Mr. Sheerin says that the whole Independent telephone business has been a spontaneous growth, showing clearly that all a good thing needs is an opportunity. Eight years ago there were not quite 6,000 telephones in Indiana. Now of Independent telephones alone there are over 80,000, the combined Bell companies claiming 22,000. In the city of Indianapolis, as late as only six years ago, there were not to exceed 2,000 telephones. Now the new company has over 6,000, and is growing without the aid of canvassers at the rate of 200 a month. It has taken an immense amount of work and a large amount of capital to bring this about, and both were furnished mainly by the people of Indiana, less than ten per cent. of the capital coming from outside the State. The total indebtedness on the telephone property of the State does not exceed twenty per cent. of the cost of construction.

The telephone has proved specially valuable to the business interests of Indianapolis in bringing the people of the State into close touch with its capital and great commercial center. The new Long Distance Telephone Company has extended its lines into all the counties immediately surrounding Indianapolis, and now has connection with 47,000 telephones, 21,000 of these being rural telephones, 11,000 in the houses of actual farmers and 10,000 in the small towns and villages outside the county seats. The remainder of the 47,000 are in the county seats. Through connection with other Independent lines the New Long Distance Telephone Company has 20,000 more telephones, all of which have access to Indianapolis. The remainder of the 80,000 will be connected up within the year.

The wholesale business interests of the capital city and the stock yards have particularly been benefitted. For a year and a half the entire business of the stock yards has been done over the Independent lines. The many commission firms put in thirty to fifty calls each for different parts of the State every morning over the New Long Distance Company's lines. Their agents are at the line at appointed times and immense transactions are closed in a few minutes. Practically all the shipments made to the stock yards are upon telephone orders. The information that the stock yard people get through the telephone of the livestock resources of the State is wonderful in its scope, covering, as it does, the number, the age, the condition and time at which in all probability the stock will be put on the market.

The wholesale district has been largely benefitted because the retailer in the country can order by telephone and have the goods delivered by way of freight or trolley in an hour or two. The retailer no longer haggles between prices offered by Indianapolis houses and those of Cincinnati, Chicago, or St. Louis. He may carry smaller stocks now and get more frequent shipments from Indianapolis, which is nearest.

EXTENDS PRIVILEGES TO ELECTRICAL STUDENTS

The American Institute of Electrical Engineers has arranged to extend the following privileges to those who are regularly pursuing studies in electrical engineering, such individuals to be designated as students of the American Institute of Electrical Engineers:

The privilege of attending all meetings of the institute except such as relate to its management; they will receive the regular announcements and printed copies of monthly transactions, and may purchase the semi-annual bound volumes of the transactions at the price of $3.50 per copy.

These privileges will be granted upon payment in advance of the annual sum of $3.

TRADE NOTES

The Chicago, Union Pacific & Northwestern Line runs the Overland Limited, solid train Chicago to the coast daily.

The Lambert-Schmidt Telephone Manufacturing Company has received a contract for equipping the United States Hotel at Saratoga Springs, N. Y., with a 900-telephone intercommunicating system.

The Stromberg-Carlson Telephone Manufacturing Company recently closed contracts for switchboards with the Bergholz Telephone Company, Bergholz, Ohio, and the Winona Telephone Company, Winona, Ohio.

The Eureka Electric Company, Chicago, is sending out a booklet containing letters from satisfied users of Eureka telephones and switchboards. It is very tastefully gotten up and the typographical make-up is neat and attractive. "They Say," is the title.

The Connecticut Telephone and Electric Company has been incorporated with the following officers: E. Wilcox, president; B. L. Lawton, vice-president and treasurer, and B. C. Rogers, secretary. The company recently constructed a large, new factory and has equipped it with the very latest automatic machinery, making it probably the finest telephone plant in the East. The Connecticut Telephone and Electric Company was organized in 1895, and carried on as a partnership, but its business has reached such proportions that it was thought advisable to incorporate.

The American Telephone Journal

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TOLL SERVICE ABROAD AND HERE

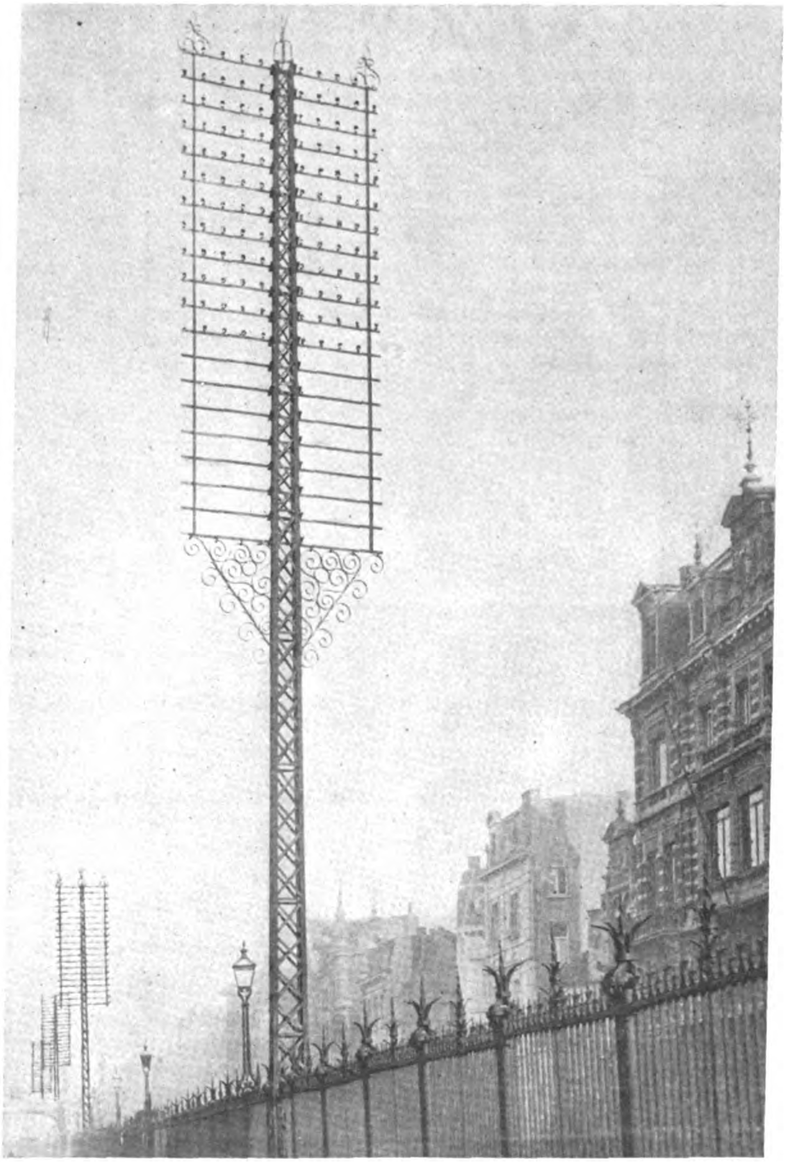
By Klas Weman.

TOLL lines connecting the Independent telephone companies, exchanges are rapidly being constructed, and we will soon have an extensive system of interurban lines in operation. The capital invested in this kind of work represents an enormous sum, which is increasing every day. If the toll line is expected to pay dividends on the capital invested, not only the line construction should be taken care of and kept in good condition, but also the switchboard where the line terminates must be arranged so that the transferring of incoming and outgoing calls may be carried out with the least possible delay and expense.

In view of this rapidly growing construction, it will be interesting to know what is being done in Europe, where special effort has been made to perfect a high grade long distance toll service.

Wherever two or more operators have to be depended on for a connection, there is always delays and uncertainty. The multiple board has made it possible for every operator to complete any desired connection between local subscribers independently. The ideal toll board therefore should have a full multiple, so that the toll operator could alone complete every connection.

In many places in Europe this arrangement is used, needless to say, with perfect results. It is expensive, but the service cannot be improved upon. The toll section is placed in a separate room, and the cables first pass through the multiple of this section. Double break jacks are provided in the multiple in order to prevent a main board operator from cutting in and disturbing a toll connection. The board has double decks, and the lower shelf is entirely free from plugs, cams, etc., in order to facilitate writing. The toll lines in some cases terminate in a high resistance drop (used both for calling and clearing) and a single cord and plug, although pairs of cords and plugs are generally employed. In the last case the line drop is cut out by the answering jack and a high-resistance clearing-out drop is bridged across the cord circuit instead. In both cases the toll lines are represented within the section by strips of jacks below the multiple.



A BELGIAN POLE LINE.

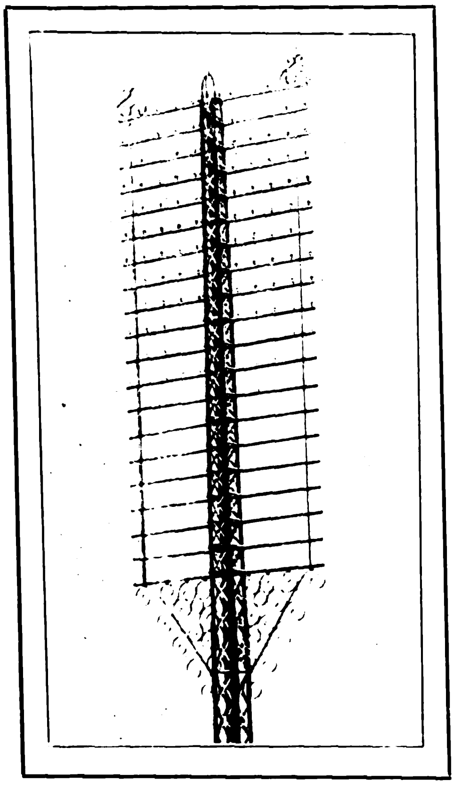
The line drops, cams, auxiliary keys and automatic visuals for order wires are all placed in the home section panel.

The toll operator can cut off any local connections if one of the talking parties is wanted over the toll line. She has for this purpose a special plug and cord, which, in case a local line tests busy, is inserted. It does not break the connection, and she is therefore able to announce to both parties that she is going to cut off their conversation, and that one of them is wanted and will be immediately connected with the party over the toll line. She then completes the toll connection, which breaks the local connection.

Each toll position is provided with two order wires having automatic visuals and corresponding answering buttons. All visuals and corresponding jacks are repeated once in every section of the main board. If a local subscriber calls for the toll board, the main operator immediately connects him with one of the toll operators through a disengaged wire and leaves the circuit. If all the order wires are busy, the subscriber is told so at once by the main operator, and need not tie his line up by waiting. When the toll operator has taken down his number and the number he wants, she simply disconnects, which will give clearing out signals to the local operators. (If

C. B. system is used, the subscriber will cause the other supervisory to appear by replacing his receiver.) When the desired party on the toll line has been called, the toll operator connects direct in the multiple.

The visuals for the order wire work automatically, so that when a plug is inserted in an order jack at one of the main sections, all the visuals for that particular line appear in the main board, besides the visual at the toll section. All the main board operators can therefore see at a glance what order wires are busy. When the connection is taken down, all visuals disappear again.



PHOTOGRAPH SHOWING CROSS-ARM SECTION OF BELGIAN POLE LINE.

Another arrangement very frequently used in large exchanges is to have small toll boards for one operator, and let her take care of three to six toll lines. The order wires are arranged as previously described, but outgoing trunks are necessary.

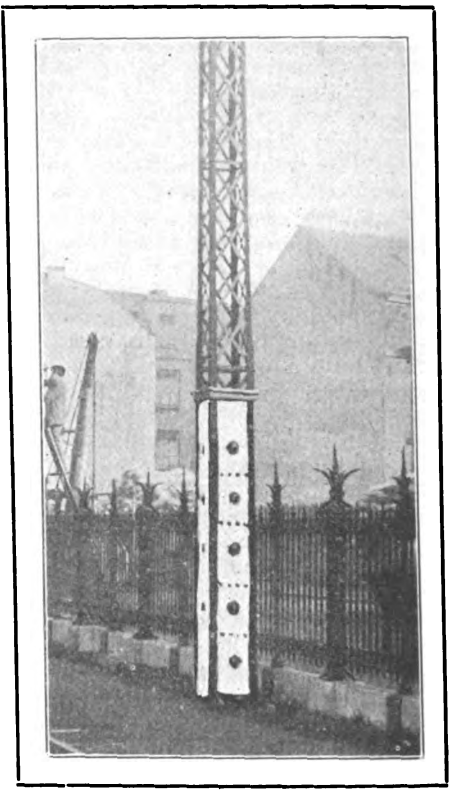
These, generally the same number as the toll lines for each operator, terminate in automatic visuals and single cords and plugs at special sections of the main board, where each operator takes care of twenty-five to thirty trunks. The toll board is equipped with line drops and answering jacks, cords and plugs, with corresponding clearing-out drops and cams and auxiliary keys; also with two order wires, and outgoing trunk lines having automatic visuals and corresponding jacks.

The operators at the special multiple sections have nothing to do with the subscribers except when a line is busy. In that case, the special plug is used for announcing to the two talking parties that one of them is wanted over the toll line. Otherwise, when a toll operator has inserted a plug in one of the trunks and an automatic visual appears at each end of the line, the special operator presses down the corresponding key, whereby both visuals disappear and the toll operator orders the number she wants. This is given by the corresponding cord and plug. When the conversation is ended and the toll operator disconnects, both visuals are again displayed, but disappear when the special operator takes down the cord. If the special operator does not immediately press down the listening key when the visual appears, the toll operator has a speaking key whereby she can speak directly in the special operator's head gear receiver and call her attention to the fact.

The special sections have double break jacks in the multiple, and the cables pass through these sections first, so that a toll connection cannot be interrupted by a local operator. Very often the order wires are taken care of by separate operators. The order slips are then distributed to the proper toll operators and the connections carried out by them. All the toll lines are repeated by jack strips in every individual toll board.

At night all the toll lines are thrown over to the special sections by the trunk lines. The drops on these sections are cut out during the day.

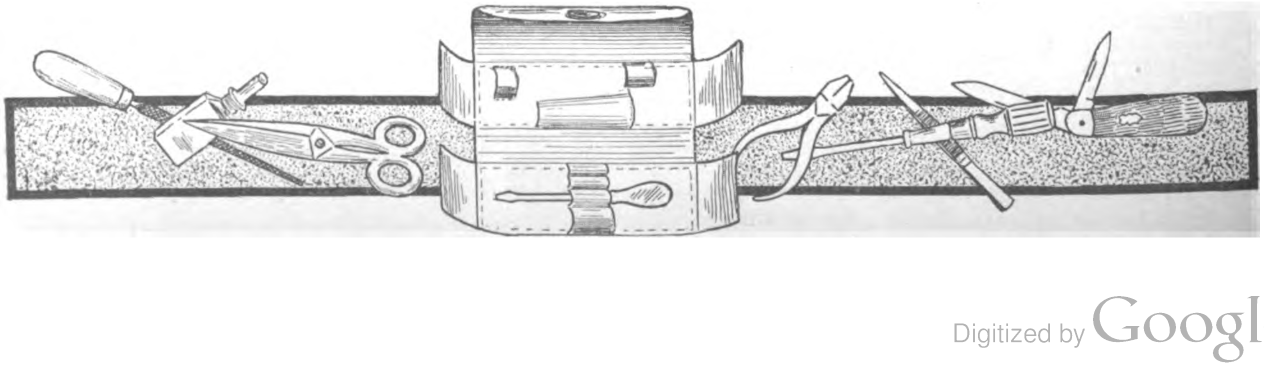
Again, we have in other places the toll board arranged as last described, but the outgoing trunks are distributed between the main board operators instead of having special sections for this purpose. Each main operator takes care of from two to four trunks in addition to her local subscribers, and she can therefore generally handle these outgoing trunks and not have her position overloaded.



PHOTOGRAPH SHOWING BELGIAN POLE CONSTRUCTION AT BASE.

Proper toll arrangements cannot always be found in our exchanges. We sometimes find the toll operator loaded with ten to twenty toll lines, and the trunking arrangements are poor. The same operator has to take care of any amount of orders that are poured in from the main board. Even though all the twenty are not interurban lines, they are generally just as busy, and somebody will have to wait, as the operator cannot possibly take care of everything at the same time. The trunk lines are often used both ways (which always causes confusion), but generally each toll operator has eight to ten outgoing and the same number of incoming trunks It is not possible for the operator to answer more than one order at a time, even if she does not have to attend to the toll lines. The main operators may connect subscribers wanting the toll board on all the ten incoming trunks, and they have to wait until the toll operator finds time to answer. In the meantime, all their lines test busy. If the subscriber can at once get his toll connection, it is well; but if his call later has to go through an outgoing trunk, nothing is gained by having so many incoming trunks. It is decidedly a better plan to have only two order wires for each toll operator, and have all the order wires repeated in the main board. If one of them is free, the subscriber is connected with a toll operator who has a chance to operate it in the near future. And if all should be busy, it is better to have the main operator tell him to call again. It will relieve the toll operator of a good deal of irritation, as she need not see all the visuals indicating waiting and impatient subscribers.

If we now turn to the outgoing trunks, we find that generally all of them terminate at the first position of the main board. The operator at this position generally has the oldest and busiest subscribers, if the work has not been distributed evenly by means of the intermediate field, and this is not always done. In addition, she must make all the connections from the toll board to the main board. The arrangement of distributing the outgoing trunks between several of the main operators is vastly better. The toll operator is not then dependent on one operator, and this operator cannot complain of being unfairly loaded with too much work.



CONTEMPORARY CROSS TALK

By "The Listening Key."

CONTINUING our talk of last week, it will be found that in the line plant it is the easiest matter in the world to find a unit. Lines are tangible and measurable in fixed terms, inches, feet, yards, miles, or, if you prefer the metric system, in metres and kilometres. This fact, which is most obvious, points to a very curious state of affairs in the telephone business, when one comes to analyze telephone methods and telephone charges. The subscriber's share of switchboard plant is, we have seen, a very variable quantity, practically impossible to measure and no attempt is made to measure it. The subscriber's station equipment is easy to measure, because each part of it is a tangible object. At one time it was practically the only measure by which rates were fixed, and even to-day every item of it is strictly measured, so to speak, and has its corresponding rate. But the line plant, which is the most expensive part of the whole system, worth usually twice as much as the station and exchange equipment together, is not measured at all in connection with the rate, and is not considered to have any bearing on the rate unless the subscriber's station is at such a distance from the exchange as to require an unusually long line.

No Attention to Line Costs

Yet the line is measured by the simplest and most universal of all measures, length; and its cost is directly proportional to its length. When we get beyond the limit up to which the line is an unconsidered quantity, a mile or a mile-and-a-half from the exchange, or whatever it may be, the line is measured very closely and the excess length charged for very strictly. In the case of private lines not operated at an exchange the length of the line is the governing factor in the rate and is charged for down to small fractions of a mile. Yet the same company which charges scrupulously for a quarter of a mile of line on an extra long line or on a private line thinks nothing of charging the same rate to a man who has a line of a hundred yards or so as to one who has a line a mile or so long. The difference in cost between a mile of line and a hundred yards of line is immensely greater than the difference in cost between an ordinary wall set and any of the special sets that are got up to suit the tastes and requirements of subscribers.

Line Plant is Most Costly

For the telephone manager to cling so tenaciously to the deceitful old average in the case of his lines, when he has always measured his subscriber's equipment and is now beginning to measure his traffic, is all the more remarkable because he knows better than any man that the lines form by far the most costly part of his whole plant. In fact, an analysis of the capital account of any telephone system will show that the line plant represents about twice the total expenditure for all the rest of the system; in other words, that about two-thirds of the total capital cost of the system is for line plant. Therefore there is much more reason for basing rates on the length of the line than on the subscriber's station equipment, which represents about one-eighth to one-sixth of the total capital cost of the system.

Vary Rates According to Length

To vary the rates in proportion to the length of the subscriber's line is a proposition based on the real conditions of the business. The line is the most expensive part of the whole system, and the cost of any particular subscriber's share of the plant depends more on the amount of line involved than on any other item. The thing is actually done at present in the case of lines exceeding a certain length. Why should it not be done with lines of all lengths, starting with a minimum of say two hundred or four hundred yards? A minimum of a short distance would be necessary, and the base rate for this minimum distance would include the cost of inside wiring. Many of the stations falling within the minimum distance would have lines that would practically consist of inside wiring only, but the majority would require a certain length of cable or pole-line. The most practical and smooth-working way to establish a scale of rates varying with the distance from the exchange of the subscriber's station would be to lay out a series of zones with the exchange as a centre. Zone 1 would have a radius of say two hundred yards from the exchange, and the width of each succeeding zone would be two hundred yards. Each zone would have its corresponding rate, and on receiving an order for connection a glance at a map would show the rate to be charged.

Zone System is Best Method

From the point of view of the telephone company nothing could be more appropriate or more correct than a scale of rates varying in accordance with the length of the subscriber's line, and no method of applying such a scale could be handier or simpler than the zone system suggested. Such a scale of rates would give to a flat rate tariff some of the elasticity it so badly needs, and would add to the flexibility and to the just principle which are the strong features of the message rate tariff. On the broad principle of paying in proportion to service rendered it would appeal to the general public, especially to that portion of it which happened to be situated within the inner zones. Those in the outer zones, who might find their rates raised, would perhaps not be so enthusiastic, but no great reform is accomplished without there being some sufferers and some complaint. In the long run people would adjust themselves as they have to other changes, based on reasonable and correct principles, that have been brought about by the march of scientific progress.

Public Would Object

That there are several objections to the proposal, especially from the public point of view, is quite apparent. In the first place it is clear, since telephone exchanges are generally situated as nearly in the centre of important districts as they can be placed, that the majority of the people who would benefit most by a lower rate for a short line would be the people who could best afford to pay a high rate. The innermost zone or two would in most cases cover an area where rents are high, and where important business concerns congregate, and these concerns rely so much on the telephone service nowadays that they can afford to pay almost any rate for it; so that to a certain extent a concession in rate would be thrown away on them. Then in the outer zones would be found the areas where rents are lower and business concerns consequently less prosperous and residents less well-to-do. Here, where lower rates are really required to tempt the subscribers, relatively higher rates would be imposed by the zone system. On the surface those look like distinctly weighty and serious disadvantages, and it would take trial and experiment to determine how great they would really be in practice. Again, from a flat rate point of view there is the difficulty that the present rate is based on an average. To adopt the zone system and obtain the same average revenue it would be necessary to raise some rates while lowering others.

Difficulties Not Insurmountable

These difficulties are not so serious as they really look, and in the case of a message rate system they are by no means insurmountable from a business point of view. The subscribers in the inner zone would be mainly large users, and a reduction in the line rate would tend to make them become larger users and to take more lines. There would be some low-traffic short-line men, but the fact of having a low rate in the zone near the exchange would be of great aid in finding subscribers among the small people always found sandwiched in among the big ones. In the other zones, where the line rates would be higher, there would be perhaps more small users than large, and on these the higher line rate would bear more heavily, but the fact of their being small users justifies the higher line charge and makes them bear more evenly their share of the cost of the service than under an average line rate. For a flat rate system to make the change would undoubtedly be more difficult than for a message rate system, but such difficulties are part of the consequences of the original sin of flat rates.

TELEPHONE EXCHANGE ENGINEERING—ARTICLE VII

DESIGN OF A CENTRAL OFFICE EXCHANGE EQUIPMENT

By Ray H. Manson, Albion D. T. Libby and Charles A. Simpson.

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THE foregoing specifications having been received from the telephone company by the manufacturer, and his proposition accepted, he will be ready to start manufacturing the equipment.

In order not to bias any of our readers, it has been thought advisable to give a design of common battery exchange equipment used extensively in this country and which is not for sale on the open market; and follow this with a general discussion which, it is hoped, will start the reader on a line of thought whereby he will be enabled to determine the best practice.

Circuits: The circuits and their operation, for the system used in this design, are as follows:

Subscribers' Line Circuit: Fig. 1 shows the apparatus and its theoretical wiring necessary for each "subscriber's line." The subscriber's set is shown to the left. Following the two-line wires to the right, they pass through the main distributing frame, then to the intermediate, and then to the muliple jacks, also to the answering jack, line and cut-off relays. Each line has a line and cut-off relay, an answering and multiple jacks and a line lamp signal. The auxiliary relay and its lamp is common to each operator's position. The three hundred ohm resistance is used as a shunt to the line lamp; so in case the line lamps burn out or break the subscriber will be able to get the "Office" through the auxiliary relay lighting the auxiliary lamp; hence, if the auxiliary lamp lights without a subscriber's line lamp, the operator knows that some line lamp is in trouble and will report the same to the wire chief, who can easily locate the faulty lamp by plugging into the answering jacks with a plug having the tip and ring short-circuited and with no sleeve connection. This action will operate the line relays, and hence light their corresponding lamps. When no light appears with the plug inserted in a jack, the trouble is located.

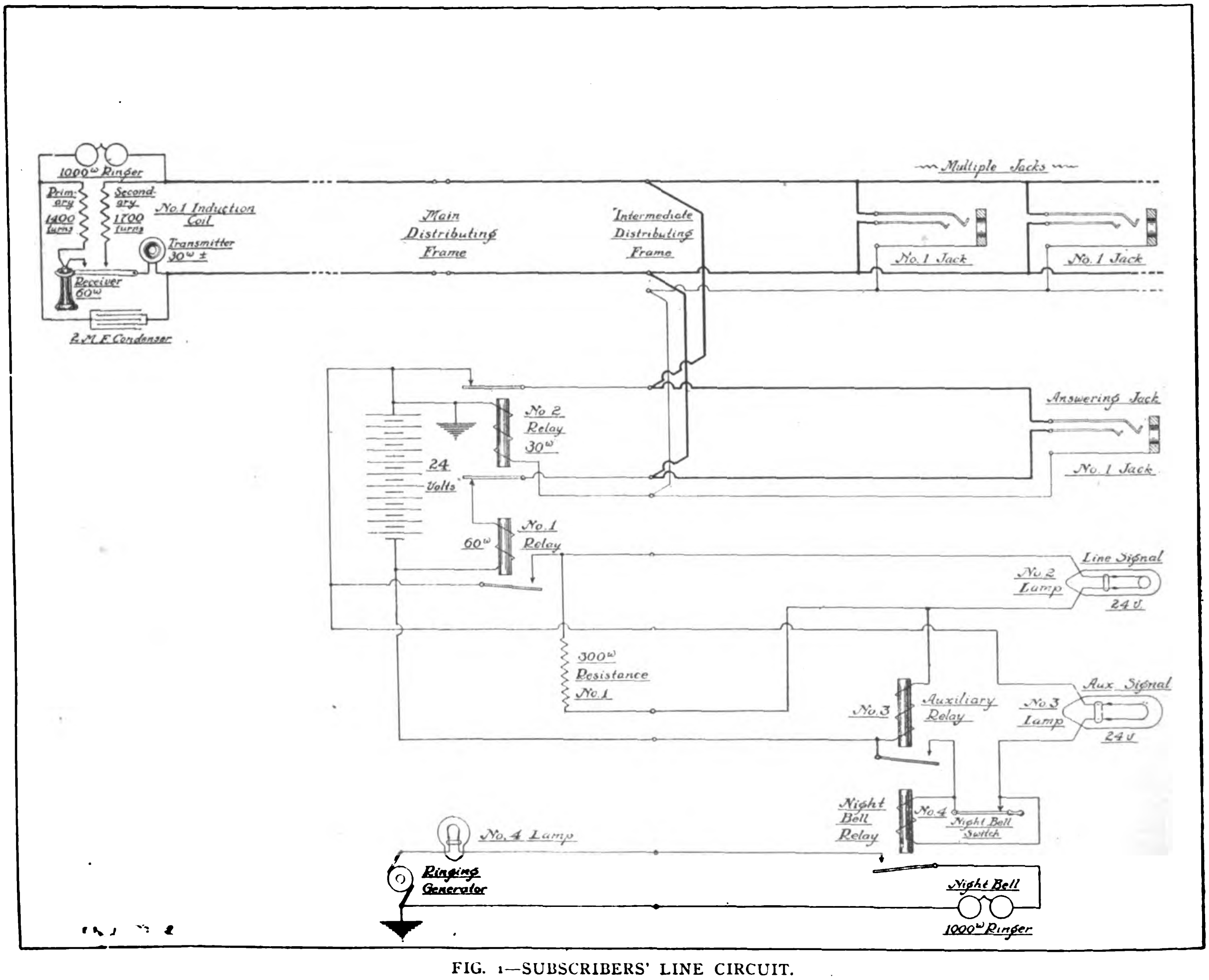

FIG. 1—SUBSCRIBERS' LINE CIRCUIT.

The three-hundred ohm coils are mounted at the relay rack, one for each line and cut-off relay. All the coils for one position are strapped together on one side and a rubber-covered wire taken to the auxiliary relay. The exchange is provided with one night bell relay, night bell switch and bell as shown. During the day the switch is closed, short-circuiting the relay and keeping it from operating. At night the night bell switch is opened, then a call will operate the night bell relay and sound an alarm, and the pilot lamp will direct the operator to the position, and the line lamp to the line.

Subscribers' Cord Circuit: The "cord circuit" is shown in Fig. 2, giving the apparatus and wiring of a single pair of cords. All fifteen pairs for each position are wired in a similar manner. The repeating coil is mounted on the coil rack and wired to the connecting board on the rear of the section. The eighty-three and one-half ohm and forty ohm resistance coils are wound on the same spool and mounted in rear of the position just above the

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Editor's Note.—The first article of this series appeared in the issue of November 22. They will continue for many months.

supervisory relays, which for both calling and answering coils are mounted on one strip.

The supervisory lamps are mounted in the plug shelf. A combined ringing and listening key and a position ring-down key is connected to the calling cord. The order wire and ring-down keys will be described later. There is but one ring-down key to a position. The order wires are multipled at each position, each button being stamped with the circuit to which it is connected. The operator's "cut-in" jack is mounted in front of the key shelf, so designed that no battery flows until the plug connected with the operator's head telephone is inserted. Fig. 2 shows that when the answering plug is inserted in one jack and the calling plug into another the two parties can talk through the repeating coil which supplies battery to both.

The positive side of the battery is grounded, and in describing the operation of the circuits the positive side will be considered as "ground" and the negative side as "battery." Current will be spoken of as flowing from the battery to ground. By "local subscriber" is meant a subscriber connected direct with the same exchange as the calling party.

Subscriber "A" takes his receiver from the hook. This act closes the battery circuit through the sixty-ohm relay (line relay), the transmitter and secondary of the induction coil at station "A" back to ground. The line relay will operate, closing circuit through the line lamp and the auxiliary relay to battery. The line lamp and the auxiliary lamp will light. When the operator sees this signal, she takes one of the answering (rear plugs) and inserts it into the answering jack associated with the line lamp. This act operates the cut-off relay. Battery will flow through the eighty-three and one-half ohm coil (Fig. 2) through the 12-volt answering supervisory lamp to the sleeve of the answering plug to the sleeve of the answering jack (Fig. 1), through the cut-off relay to ground. This relay will be drawn up and in so doing, cuts the battery off from the line relay, which will fall back to its normal position, opening up the line lamp circuit which causes the auxiliary relay to fall to normal and extinguishes the auxiliary lamp, provided no other lamps for that position are lighted.

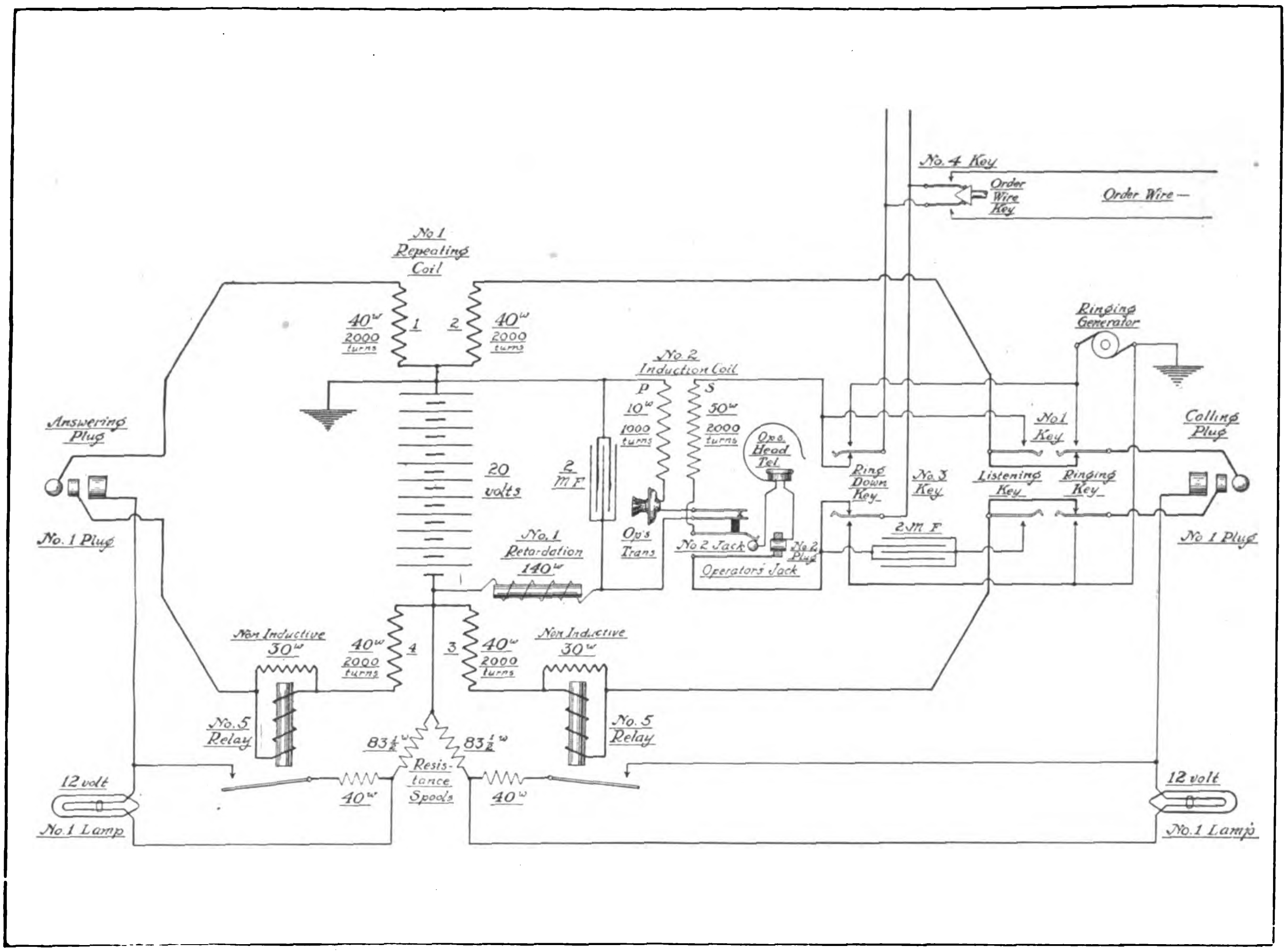
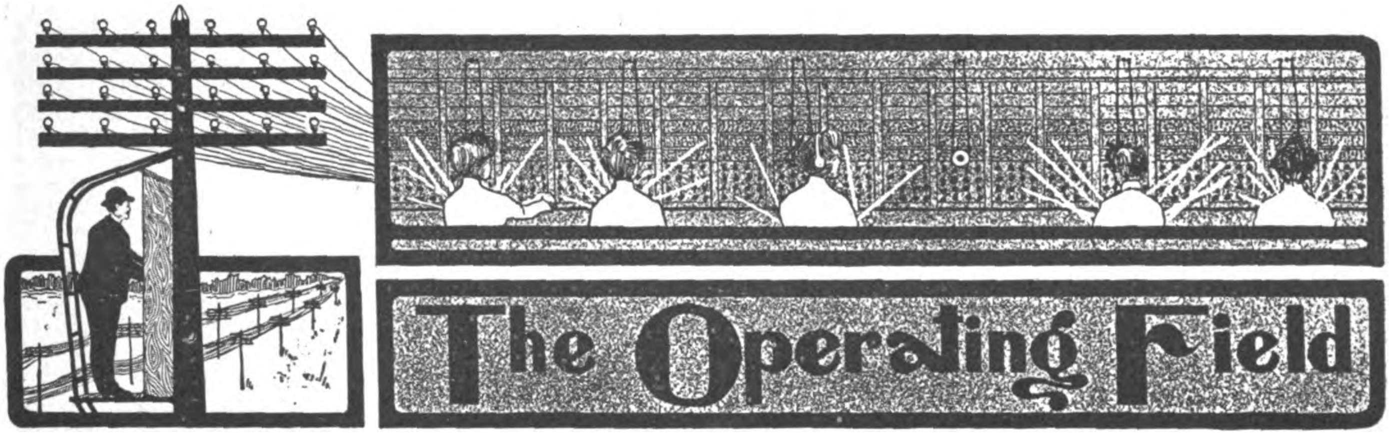


FIG. 2—CORD CIRCUIT.

When the operator inserts the answering plug (Fig. 2) into the answering jack of the calling subscriber "A," battery will flow through winding No. 4 of the repeating coil, through the supervisory relay to the ring of the plug, thence to the ring spring of the jack out on the line through the "A" subscriber's instrument, back on the tip side of the line to the tip of the plug, through winding No. 1 of the repeating coil to ground. The supervisory relay then operates and a forty-ohm shunt is thrown around the supervisory lamp which extinguishes the lamp as long as current is flowing.

Then the operator throws the cam of the ringing and listening key, corresponding to the answering cord, to the listening position (where it will stay until restored) and inquires "Number?" Having obtained the number, she takes the calling plug corresponding to the answering cord and touches the tip to the sleeve of the multiple jack of the number asked for. If this line is busy, the operator will get a click in her receiver. If she gets no click, she plugs into the multiple jack of the party wanted and pulls the cam of her ringing key forward, which throws generator out on the tip side of line to station "B" through bell and condenser back over sleeve side of line through contact of cut-off relay to ground. When the calling plug is inserted into the multiple jack, battery will flow through the eighty-three and one-half ohm coil connected to the calling plug, through the calling supervisory lamp to the sleeve of the plug and jack, then through the cut-off relay connected to "B's" line to ground. The cut-off relay being pulled up will keep "B's" line lamp from lighting, but the calling supervisory lamp will be lighted, since his receiver is on the hook, and hence no current is flowing through the supervisory relay so that the supervisory lamp has no shunt around it. When "B" answers the call, the calling supervisory relay will be operated and the supervisory lamp extinguished. When the parties are through talking, they hang up their receivers, causing the supervisory relays to fall back to normal. This removes the forty-ohm shunt from the supervisory lamps and they will light, informing the operator that both parties are through talking. She then pulls out both plugs, restoring everything to its normal condition.



The Operating Field

A WIDE AWAKE TELEPHONE TOWN.

By H. S. O'Brien, *Special Correspondent.*

THE Danville, Ind., Mutual Telephone Company has been sold to J. M. Griest, of New Haven, Conn., by Otis T. Spencer, its president. The deal includes a dozen small exchanges and connections with toll lines in all directions. The consideration is said to have been $35,000. Mr. Griest will move to Danville and take personal charge of his new enterprise.

The Danville plant is said to be the largest in the world in proportion to the population of the place. Beginning June 1, 1897, with 99 instruments in Danville and one toll line to North Salem, nine miles away, the system has grown to over 350 telephones in the town, over 250 farm connections and twenty-one toll stations requiring 125 miles of wire. In the town there is a telephone to every five inhabitants. It is on this basis that the claim rests that it is the largest system proportionately in the world.

The system covers Hendricks county and extends into Boone and Putnam counties. Connections are available with 78,000 instruments in the State. There are three circuits from Danville to Indianapolis and another that connects Danville, Greencastle and Indianapolis. A five-section switchboard is used and recently a new fifty-line toll board with two position lamp signal transfer was put in. The rates are $2 for business and 75 cents for residence telephones.

LOCKPORT, N. Y., HOME COMPANY.

INCORPORATED under the laws of the State of New York, July 10, 1900, with a capitalization of $125,000, the Home Telephone Company, of Lockport, N. Y., began business in the city in September, 1901. Though starting with only fifty subscribers, the company equipped its exchange in the most complete manner, putting in a large switchboard and the most approved apparatus known in the telephone business. From the outset it has given a service that is unrivaled in promptness by that of any telephone exchange in the country. It employs only the most expert operators and requires from them the most courteous and intelligent attention to the interests of the subscribers. Results have shown that the company was fully justified in the confidence it evinced in the future of the business, and that it took the right means to bring about the present flourishing state of affairs.

The system used by the company was constructed by the Rawson Electric Company. From the original fifty subscribers the Home Telephone Company's patronage has grown in a way that is little short of marvellous, until now it has more than 650 telephones in operation.

The officers of the company are men well known in Lockport, being prominent citizens, engaged in other large commercial enterprises. The president is W. T. Ransom, the vice-president, A. D. Pomeroy, and the secretary-treasurer and manager, H. W. Shannon.

SUING CHICAGO TELEPHONE COMPANY.

HUNDREDS of lawsuits are to be brought at once against the Chicago Telephone Company to recover money claimed to have been collected by the company in excess of the rate authorized by city ordinance. For the purpose of conducting the war on the corporation the complainants have organized the Chicago Telephone Adjustment Company, which will attend to the litigation for its members. William B. Judd is president of the company.

As a forerunner of the many suits to come eighteen have already been started.

These actions are the consequence of the proceedings brought by the Illinois Manufacturers' Association to compel the telephone company to reduce its annual charge to the $125 specified by ordinance. Judge Tuley found that the company had no right to charge the tolls in force, which ran up to $175 and more in many cases.

The amount to be demanded by the patrons of the company has not yet been figured up, but it will be very large. The average claim of the 500 litigants will be, it is believed, fully $200, which would make a total of $1,000,000.

RURAL FREE DELIVERY TELEPHONES.

IN answer to a resolution of Senator Fairbanks, of Indiana, asking as to the feasibility of using telephones to assist in the rural free delivery of mail, First Assistant Postmaster-General Wynne has reported to the Senate that:

"It is felt that it is practicable to use the telephone in connection with the rural free delivery service, especially in those counties or communities in which the service is well established and the telephone generally used by the farmers or by country stores."

It is said the Department's first experiments in this direction will be in Central Indiana, investigations showing that in no other State is the telephone coming into such general use by the farmers. Postmasters from many county seats in the State reported to the department that the farmer who is without a telephone is now regarded as being unprogressive.

COMMITTEE IS FAVORABLE TO COMPETITION.

A SPECIAL committee has reported to the Nebraska State Senate on telephone conditions in Nebraska and neighboring States. Its conclusions are the most sensible and comprehensive ever drawn by a body of laymen when the telephone was the subject of discussion. It is interesting to compare this committee's report with that of the special telephone committee which reported to the Hamilton, Ontario, Canada, council in favor of municipal control. Among other things, the Nebraska committee finds that competition in the telephone business is desirable, and that it costs more to construct and operate lines in some places than in others. The gist of the report is as follows:

> We find from the evidence that the cost of construction varies so much in different localities, and depends so much upon the material used therefor, that it is impossible to say just what the total cost per telephone, or per line, or per mile, should be. In some places, in smaller towns, the evidence shows that plants have been installed at so low a rate as $40 per line. Where this low cost of construction exists, cheap material and cheap service are the results. In other places, such as cities like Omaha and Minneapolis, the cost of construction appears to have averaged about $155 to $160 per line, while in New York City the evidence shows that the cost per telephone is about $600.
>
> We find further that the cost of construction and operation varies to a great extent in plants of the same size in various communities, such cost being affected by the quality of the material used in construction, the quality of instruments, the cost of labor, freight charges and the natural difficulties and elements encountered in the construction thereof.
>
> The telephone businesss in Nebraska is controlled at present by the Nebraska (Bell) Telephone Company, and about one hundred companies

known as Independent companies, the Bell company having about seventy-seven exchanges and about 15,000 miles of toll lines, and the Independent companies operating about one hundred exchanges and five thousand miles of toll lines. The highest rates in existence in the State are in the city of Omaha. There the exchange has in operation about 5,200 telephones. The best class of service, which is for a full metallic circuit unlimited service business telephone, is charged for at the rate of $75 per month within a radius of two miles from the central office, which charge is gradually increased for each quarter of a mile beyond the two-mile limit, and the lowest class of service is for a ten-party line residence telephone, which is $1.50 per month.

No testimony as to the rates in the city of Lincoln was taken, but in all other cities and towns throughout the State where the Bell Telephone Company has exchanges installed we find that the rates vary from $3 to $4 per month for full metallic circuit business telephones and for residence telephones from $2 to $3.50 per month for full metallic circuit.

The Independent rates over the State are mostly $1 for residence and $2 for business, but the rates vary within those two extremes. We find that where the Nebraska (Bell) Telephone Company has competition with Independent companies, it has reduced its rates in some instances to as low as 75 cents per month for residence telephones and $1.75 for business telephones, where prior to such competition the charges had been more than double that amount.

We find further that competition between the Bell company and Independent companies has always resulted in lowering the rates charged from 50 to 100 per cent. The Bell company explained as a reason for lowering the rates in these localities that it was necessary in order to retain their business.

In the opinion of your committee, where a public service corporation is granted a monopoly of the business of the village, city or community, the granting power should always control and supervise the rates and charges made by such corporation, and such granting power ought not to have the right to grant an exclusive franchise without fixing in the franchise reasonable rates and charges for the service to be rendered for the corporations thereunder, and the granting power should always retain the right, and it should be their duty by law to revise the rates and charges permitted at certain stated times fixed in the franchise, so that at all times the rates or charges for the service rendered should be such as would give to such corporation only a fair and reasonable income upon the investment after paying the expenses of maintenance and operation.

WILL SOON HAVE NEW YORK CONNECTIONS.

THE Anthracite Telephone Company, of Hazleton, Pa., has established long-distance communication with Philadelphia. The Independent lines now reach most of the cities and towns in the State. Connection can be had from Hazleton as far east as Trenton, taking in many towns in the State of New Jersey. It will not be long until Scranton, and with it Hazleton, will be in communication with Buffalo. The line to Binghamton is yet to be completed and there are other short spans to be made before the connections are finished.

SUCCESSFUL NEW YORK COMPANY.

THE Oneonta Telephone Company, which commenced operation in Oneonta, N. Y., about a year ago with 90 subscribers, now has over 500 patrons, with additional ones being added daily. The Bell Company has but 154 subscribers in Oneonta, and its poor service and equipment is causing a steady reduction in its patronage.

When the Oneonta Company first started, its equipment consisted of a small magneto switchboard. Business came with a rush, and the facilities were soon inadequate to supply the demands for service. The company then installed a North common battery switchboard with a capacity of 600 lines. This has been increased recently by the addition of a second board with 400 line capacity, making an ultimate capacity of 1,000 lines.

The company has connection throughout Otsego County. Lines now building will give it long distance service to Albany, Utica, Binghamton and the splendid Independent toll and long-distance system in New York and nearby States.

FARMER LINES IN OHIO.

GEORGE H. MOWRY, of Perrysville, Ohio, in a letter to THE AMERICAN TELEPHONE JOURNAL, gives some interesting facts concerning the organization and management of farmer lines. He writes as follows:

"Farmers of Richland and Ashland counties, Ohio, got together and on February 28, 1900, organized the Monroe Telephone Company. It was incorporated with a capital stock of $5,000, at a par value of $15 per share. Under the rules of this company, each farmer wishing a telephone builds a half mile of line at his own expense, using 13 24-foot white oak, chestnut, black walnut, or black ash poles, placed 200 feet apart and 4 feet in the ground. He also furnishes one-half mile of No. 11 galvanized iron wire, with side brackets for branch lines and cross-arms on the main lines.

"When he has done this, the company issues him a certificate for one share of stock, valued at $15. It also keeps the line in good repair, assessing each subscriber $2 annually as dues. Each subscriber buys his own telephone, Stromberg-Carlson 1,600 ohm bridging instruments being used exclusively. The constitution of the company provides that all instruments must have the approval of the board of seven directors. Also that no subscriber may own more than three shares of stock, thus insuring that the concern will always remain under the control of the subscribers.

"New lines are being extended on nearly all roads from ten to fifteen miles from the central station at Mansfield, and the company is very popular in the vicinity. As Mansfield is a large business and railroad centre, the service of this company is of the utmost value."

UTAH COMPANY MEANS BUSINESS.

By EDWARD HICKS, *Special Correspondent.*

NOW that it has obtained a franchise in Salt Lake City, the Utah Home Telephone Company is preparing to branch out on a broad and comprehensive scale. It has already franchise ordinances before the councils in several other Utah cities, with every likelihood that they will be granted.

It is now asserted on good authority that the company's field of action will be extended to Montana and Idaho. There are ample funds back of the concern to carry out these plans. It has a capital stock of $1,000,000, which will be increased to $3,000,000 whenever necessary.

The company is now making preparations for constructing a plant in Salt Lake City with a capacity for serving 12,000 subscribers. A large building, centrally located, will be erected to serve as offices and exchange. The equipment will be furnished by the Stromberg-Carlson Telephone Manufacturing Company.

Cables will be used for all line construction, both aerial and underground. Frank M. Hall, the well-known telephone engineer of Wheeling, W. Va., has been engaged as engineer for the company.

LONG DISTANCE CONNECTIONS IN PENNSYLVANIA.

THE Consolidated Telephone Companies of Pennsylvania have now secured long distance connections with the Keystone Telephone Company's system in Philadelphia. The Keystone Company has over 10,000 subscribers in Philadelphia. Its long distance branch, the Keystone Telephone & Telegraph Company, has a splendid toll and long distance system practically covering Pennsylvania, New Jersey, Delaware, Maryland and West Virginia, and connections in New York State. It will be seen that Consolidated Company subscribers by the connection between the company and the Keystone will be able to communicate with a very large number of persons from whom they have hitherto been cut off.

PITTSBURG AND ALLEGHENY PLANS.

S. H. BROWNE, vice-president and general manager of the Pittsburg & Allegheny Telephone Company, Pittsburg, Pa., reports that improvements and extensions are being made to the company's lines and connections as rapidly as it is possible to get material. He says the company can hardly keep abreast of the great demand for new lines and new telephones and that factories are behind in the orders for instruments.

All plans have been prepared for completing a subway system at McKeesport, Pa., and it is the intention of the company to put in a magnificent plant at that point. Work on the subways cannot be commenced until April 15, owing to a city ordinance prohibiting the opening of streets prior to that date. The contracts for the work will be let between now and April 15. These will include the setting of poles, equipping of the central office, drawing the cables through the subways and placing the telephone instruments.

The company has options on several pieces of property in McKeesport suitable for a central exchange and operating department. About eight months will be required to put the plant in operation. It will be on a scale large enough to accommodate 3,000 subscribers.

Opinion and Comment

EUROPE NEEDS AMERICAN METHODS.

THAT sprightly and eminently readable English electrical paper, *The Electrical Times*, better known under its original and much handier title of *Lightning*, contains an interesting department headed "Our Review of Reviews." The editor of that department is an attentive reader of THE AMERICAN TELEPHONE JOURNAL, and often finds in these pages matter for comment and quotation. The comment is not always strictly respectful, but respect for the authorities is not a strong point with the editors of *Lightning*. The following abstract from a recent article in THE AMERICAN TELEPHONE JOURNAL and the accompanying pithy and suggestive comment are too good not to be re-lifted for further comment: "The Fayette Telephone Company works in Lexington, Kentucky. (Lexington is a city with, say, 25,000 inhabitants and a university.) One often hears from telephone and other companies that their service is perfection or as near thereto as is physically and morally possible. The Fayette company has had the courage and confidence to ask what was thought about it at the other end of the wire, and its manager, Mr. J. K. Johnston, to that end sent out a printed card to all the subscribers to inquire. Of about 750 cards, only two dozen came back with any complaints or suggestions. One of the seven questions on the card was: 'Are operators courteous and pleasant?' and the answer appears to be 'Yes, very.' As for speed, the Fayette gives its girls test calls, and to those that answer them quickest also prizes. Now, if it can be done in Kentucky——"

Precisely. If it can be done in Kentucky, why not in London and other places in Great Britain, as the *Electrical Times* writer evidently intended to suggest by that significant dash. To the American in Europe who attempts to use the telephone nothing connected with the telephone service is more apparent than the utter lack of smartness, speed and efficiency in operating. A member of the staff of THE AMERICAN TELEPHONE JOURNAL who was recently in Europe made some rather caustic remarks in these pages on his return regarding his experiences with the telephone in European cities. It is hardly too broad a statement to make to say that in London or in Paris the quickest way to make a telephone call is to take a cab. That is, for the stranger, at any rate. No doubt the native Londoners and Parisians do use the telephone service and use it very largely. But they are accustomed to the way of working; they no doubt do their telephoning largely by deputy, letting the office boy struggle with the slack, erratic and uncommunicative operators, and probably they get a fair proportion of the calls through in the course of time. The unfortunate American, however, accustomed to the quick service and clear replies of the operator that he generally gets at home, is only laying up exasperation for himself when he attempts to use the telephone in Europe, and in the end generally has to resort to telegrams, messengers or cabs.

However, Americans are not alone in considering the telephone service of European cities generally inefficient. The very sweeping remarks, published some time back in these pages on the London and Paris telephone service, were taken up by our watchful contemporary, *Lightning*, and apparently not wholly endorsed at the time. But ask any Londoner who uses the telephone service much what he thinks of it, and he will fill in *Lightning's* significant dash with significant and emphatic language of a most vituperative description. The same in Paris. Ask your hotel manager what he thinks of the telephone service, and, in the expressive manner that a Frenchman who speaks some English loves to employ, he will say, "Awful." He uses it a lot, too; has to in his business, so he is a good judge, and he will tell you that telephoning in Paris is one continuous struggle with incompetent, inaccurate and impertinent operators. The simple facts of the matter are that the standard of operating efficiency set by enlightened American telephone men is simply not understood in Europe, nor are the measures necessary to secure it. The proper training of operators and the proper supervision of exchange working are almost unknown arts in Europe, and the general efficiency of the service does not get from the management the attention its importance deserves. Real efficiency is by no means universal in this country, for not every telephone manager thoroughly realizes that to give a smart service is his first duty to his customers; but in Europe hardly any telephone management seems to take that point of view.

THE TERRIBLE TROUBLES OF A TELEPHONE EDITOR.

SO that an unsuspecting public may have *some* conception of the dreadful things that beset the editors who serve them, we reproduce the following editorial confidences from the April number of *Telephony*, a monthly publication, printed for the benefit of an ungrateful telephone constituency:

> Upon no class of men do there rest greater responsibilities than on the editors. Their product is **periodically born** of **hard work** and constant striving. **Each issue is an epoch** in itself.
>
> The larger part of a weekly's pages must be filled with . . . a PHANTASMAGORIA of PATCHWORK, *paragraphs* of interest to no one in the world.
>
> There can be no literature in a weekly telephone publication.
>
> Not infrequently *vague* PROGNOSTICATIONS of things yet to come are solemnly set forth by the PRESIDING GENIUS (of the weekly publication), who, in an endeavor to take himself seriously, **enacts the TRAGEDY OF VANITY DETHRONED.**
>
> The endeavor to publish telephone weeklies has invariably failed of support. . . . It (the weekly) **knocks at the door of progress** and interrupts business with its hastily collected **conglomeration of inaccuracies and misinformation.**
>
> The infallible editor has not yet been created.
>
> There is no brain so pre-eminently the superior of all the rest that it can dictate a policy on all disputed points.
>
> **Presumption** on the part of a trade journal editor, to dictate or control in the particular trade covered by his product, **is the forerunner** of the **inevitable failure of his journal.**
>
> The editorial Moses is invariably an editorial failure. In the first place, his chosen people do not care to be led out of the land of Egypt; and, in the second place, it is not his business to lead them if they did.
>
> In no field of journalism is this so true as in the telephone trade publications. The true telephone exponent must be wide-awake and pushing as the business it represents.
>
> How insignificant does a weekly appear beside the compact, attractive monthly, its pages fairly **weighted down** with the **best** thought and **power of the trade.**
>
> The publication whose home is in the center of its chosen field, *around whose office* the business life of which it is a part, **seethes and rushes on, catches the spirit and feelings**, and is in sympathy with its trade. It SPARKLES IN THE SUNLIGHT OF PROSPERITY, and **a SHROUDED IN THE GLOOM AND SHADOW OF HARD TIMES.** Its readers REACH out to it their HANDS and greet it as a friend.

Unfortunately the demands of space make it possible to reprint only a few of the powerful thoughts so ably put into classical English by the editor of *Telephony*. However, the extracts presented will serve to illustrate, in some measure, the travail and trials that come with the production of real monthly literature. And who will hereafter withhold his sympathy from the editor of the weekly when he knows that this unfortunate editor is doomed to the production of *"A Phantasmagoria of Patchwork Paragraphs?"* How fearfully this suggests that other dramatic bit of word painting:

*"A-r-r*ound the *R-r-r*ugged *R-r-r*ocks the *R-r-r*agged *R-r-r*ascal *R-r-r*an."

HAS THE LEGAL RIGHT TO RAISE RATES

A DECISION that means more to the Independent cause than any court decree handed down since the Berliner case, was filed this week by Judge Sharp, sitting in the Circuit Court at Baltimore, Md. If Judge Sharp is sustained by the higher courts, the troublesome question of inadequate rates, which is affecting many "growing companies," will be pushed along towards a favorable conclusion. Judge Sharp's decision was rendered in the case of the Maryland Telephone and Telegraph Company, one of the most important Independent companies in the field. The position of this company has attracted general attention. Operating in one of the best sections of the country, ably managed, enjoying the support of all public spirited citizens, it found its sphere limited and its usefulness hampered by the fact that its business has grown beyond the point where the rates fixed by its franchise proved profitable, under the exactions of a modern service and equipment. Confronted by this condition it raised its rates. The great majority of its subscribers saw the justice of the increase and met it cheerfully. There were some, however, who objected and took the matter into court, seeking a restraining order from Judge Sharp.

Judge Sharp sustained the company, holding that the complainants had no standing in court and that the right of proceeding against the company under the ordinance was left to the city. The rates named in the ordinance are not more than $4 a month for business houses and not more than $3 a month for dwellings.

Judge Sharp announced his decision orally, saying:

"I am satisfied that this bill cannot be maintained and must be dismissed. The ordinance contains no contract with citizens generally, but with the Mayor and City Council. When we examine the language of section 4 of the ordinance we find no covenant or agreement, but only a condition. The language reads:

> 'And be it further enacted and ordained, that the rights and privileges hereby granted are granted subject to the following conditions, namely: That the prices to be charged by the Home Telephone and Telegraph Company, of Baltimore City, shall not be more than $4 per month for telephones furnished to business offices, and not more than $3 per month for telephones furnished at dwelling houses within the corporate limits of Baltimore City, and to the further express condition that all the rights and privileges hereby and herein granted shall cease and be forever forfeited in case the said Home Telephone and Telegraph Company, of Baltimore City, shall be consolidated with any other telephone company in Baltimore City, unless the terms of the consolidation provide that the consolidated company shall not charge more than the above-mentioned rates for the use of its telephones.'

"The language used here shows that Baltimore city imposed conditions in the grant to the telephone company, but gave no rights of contract which citizens generally can enforce. It evidently was intended to leave the city the right to determine whether the conditions should be enforced or not.

"Whether the city has any rights under a proper construction of the ordinance which it can enforce against the company for what it has done, or not, I do not propose to decide, as that question is not before me.

"The bill will be dismissed."

The action of the company's attorneys in demurring to the bill of complaint caused the case to be argued on the assumption that the statements made in the bill were true. The grounds of the demurrer were as follows:

> That the bill is multifarious.
>
> That the plaintiffs have no standing in a court of equity to ask for any relief on the alleged contract between the defendants and the Mayor and City Council of Baltimore set forth in the bill.
>
> That no contract is stated in said bill whereby the defendant is obliged to furnish the plaintiffs or any of them telephones and telephone service of the kind described in said bill.
>
> That by a proper construction of Ordinance No. 110, stated in said bill, the defendant is not obliged to furnish telephones and telephone service of the kind described in said bill to the plaintiffs or any of them at the rates claimed in said bill.
>
> That the plaintiffs have not stated such a case as entitles them, or any of them, to any relief in equity against this defendant.

The argument was conducted by Edgar H. Gans for the telephone company, and Michael A. McCormick and John S. J. Healy, attorneys for the complainants.

Mr. Gans said in his argument that the complainants are not asking for such a telephone as was in use when the ordinance was passed in 1896, but for the best improved modern service. Acts passed by the Legislature in 1892 and 1894, he said, defined the meaning of the word telephone and gave the companies the right to make rates for special telephones. The complainants, he asserted, were asking for the special telephone for which the Legislature in 1894 said the companies could make special rates. The ordinary telephone contemplated in the ordinance of 1896 is the grounded circuit equipment, he argued, while the complainants want the metallic circuit equipment for the same price.

Mr. Gans and Mr. Marbury said in answer to a question of the judge that the company will furnish the ordinary telephone service for $48 a year.

"The complainants say they are entitled to a special metallic equipment for $48 a year," Mr. Gans continued. "They have been told they would be furnished with the statutory equipment at that price, but they want the best and most improved service. That is the whole case in a nutshell."

Even at the proposed increased price of $72, Mr. Gans also said, the company will furnish the same service for which the Chesapeake & Potomac Company charges $125.

Mr. Healy made the main argument for the complainants and quoted many authorities to support his contentions. He insisted that it would be impracticable to use the grounded system in Baltimore, and declared that under the ordinance of 1896 the telephone company's subscribers are entitled to the most improved service. That ordinance, he contended, had the binding effect of a statute, the city charter passed by the Legislature in 1898 having continued in force their existing ordinances. Mr. Healy also contended that the company's subscribers have the right to insist on the $48 rate and to ask an injunction restraining the company from increasing it.

Judge Sharp decided the case without leaving the bench.

ELECTRICAL MEASUREMENTS—ARTICLE X—VOLT AND AMMETER TESTS CONTINUED

By Arthur Vaughan Abbott.

WE have just shown how all kinds of resistance may be tested by a simultaneous measurement of the amount of current passing, and the fall of potential on the ends of the conductor whose resistance is desired. Evidently if the resistance of the conductor be known, a single measurement with a voltmeter or milli-voltmeter will suffice to determine the current strength, and thus amperes can be measured with a voltmeter. This is shown in Fig. 2, page 154, of The American Telephone Journal. Suppose R to be any known resistance; attach the voltmeter to O and B, the ends of the resistance, and assume V to be the reading of the needle, then the current is $C = \frac{V}{R}$. For example, suppose a wire chief wishes to know the current taken from the office battery at the hour of maximum load. Assume the power switchboard bus bars to be 10 feet long ¼ inch thick and 1 inch wide. Such a bar has an area of .250 square inches. One square inch is 1,273,236 circular mils, and ¼ inch is 318,309 circular mils. A piece of copper one circular mil in diameter and one foot long has a resistance of 9.012 ohms. If it is 10 feet long the resistance will be 90.12 ohms, but in the bus bar there are 318,309 circular mils, hence the resistance is $\frac{96.12}{318{,}309} = .0003142$ ohms. Suppose the reading on a milli-voltmeter connected to the end of the bar to be 15 millivolts, then $C = \frac{.015}{.0003142} = 47.75$ amperes. There are numberless opportunities to utilize this plan, that will at once occur to the practicing electrician. Indeed all ammeters intended to read very large currents take advantage thereof.

To return to the tests to be made with the voltmeter for a moment; there is a handy method for general resistance measurements of medium amounts, such as ringer spools, receiving coils, relays, induction and retardation coils. Set up the apparatus as shown in Fig. 1. B is any convenient battery, R is the unknown resistance to be measured, R^1 is *any* known resistance and V *m* is the voltmeter. First connect the voltmeter around R^1, and read the needle, calling the deflection V; then connect in the same way around R and read again, getting a deflection V^1; then

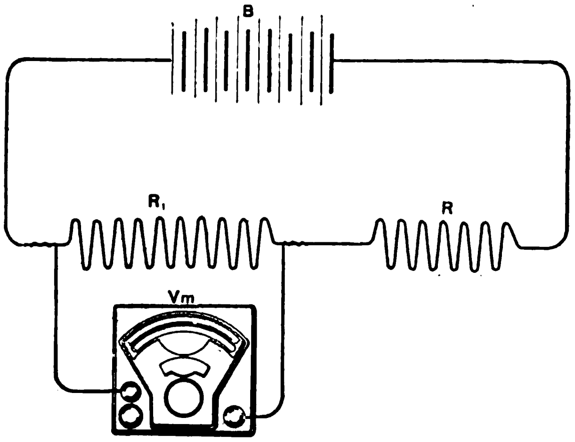


FIG. 1.

$$R : R^1, V : V^1 \text{ or } R = \frac{R^1, \times V}{V}.$$

Example: Suppose R^1, = 110 ohms, V = 15 volts, V = 5 volts, then $R = \frac{110 \times 5}{15} = 36.7$ ohms. In this method both upper and lower scales of the voltmeter can be used to secure a very wide range, thus, let R^1 = 550 ohms V (in upper scale) = 148 volts; V. (on lower scale) = 3 volts, thus $R = \frac{550 \times 148}{3}$ = 2,710 ohms; or let R^1 = 550 ohms, V (on lower scale) = 3 volts; V (on upper scale) = 148 volts, thus $R = \frac{550 \times 3}{148} = 11.16$ ohms.

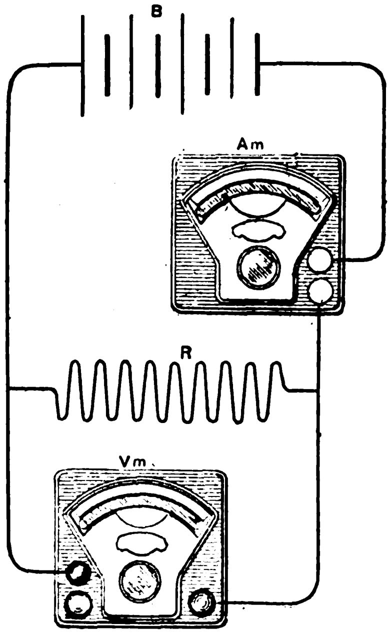


FIG. 2.

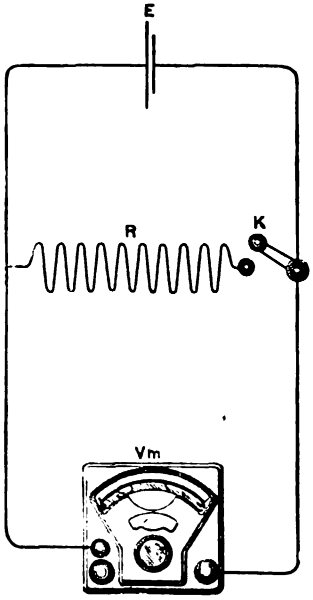


FIG. 3.

A modification of this method, which has already been alluded to, consists in substituting an ammeter for the coil of known resistances, and reading both instruments. This is illustrated in Fig. 2 in which B is the battery, A *m* the ammeter in series with it and the resistance to be measured R, while V *m* is the voltmeter placed around the resistance as before. Thus $R = \frac{V}{A}$ in which V is the voltmeter reading and A the ammeter.

Example: Suppose we wish to measure an induction coil; when connected up as shown A = 3 amperes, V = 12 volts, then

$$R = \frac{12}{3} = 4 \text{ ohms.}$$

The telephonist often must know the internal resistance of a battery or other generator of electricity. This is somewhat of a difficult task, as the thing to be measured is the source of the current and electromotive force used in measuring. It is a kind of "lifting yourself by your boot straps" problem. But with a voltmeter, a known resistance and a switch it can be done.

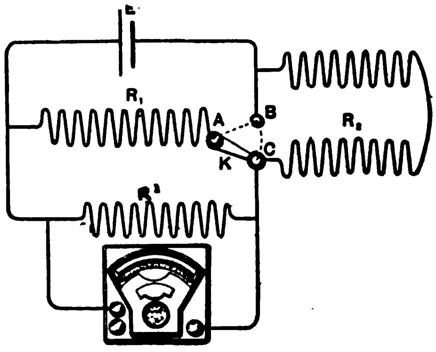


FIG. 4.

Set up the apparatus as in Fig. 3, in which E is the battery of which the resistance is desired, R the known resistance, V *m* the voltmeter and K a key or suitable switch. Read the voltmeter with K open, call the reading E, close K and re-read, calling the second deflection e. Then if r is the desired resistance of the cell $r = \frac{R \times E - e}{e}$. Example: Suppose the case of some dry cells $R = 4$ ohms, $E = 1.5$ volts $e = 1.35$ volts, then $r = \frac{1.50 - 1.75}{1.35} = .44$ ohms. This method is liable to be about 5% or 6% in error. If more accurate work is desired the following plan may be used, which requires three resistances, one of which must be a variable one. Connect as shown in Fig. 4 in which E is the battery to be measured, R^1 and R^2 are any two resistances, R^3 a variable resistance like a resistance box, and K a switch which can be placed in contact with either B or C. Adjust R^3 till the deflection of the voltmeter remains the same whether K is placed on B or C, then the resistance of E is exactly equal to R^3 and no calculation is necessary. Here is a third method of exceeding simplicity. Connect a voltmeter (low reading one) in series with the battery and a variable resistance so adjusted as to give a large deflection R^1. Increase the variable resistance to R^2 till exactly half the first deflection is produced. Then if r is the resistance of the voltmeter and R is the desired battery resistance, $R = R^2 - 2\,R^1 + r$. For example: In the case of a gravity cell r = 1 ohm, R^1 16.25, R^2 = 35.5, the $R = 35.5 - (2 \times 16.25 + 1) = 2$ ohms.

EDITOR'S NOTE.—The first article of this series appeared in the issue of January 17. They will continue many months.

FOREIGN CURRENTS

By "The Arrester."

THE final decision in the Berliner transmitter case has aroused no little interest abroad, where telephone patents of a broad nature have long been a dead issue. In England the master telephone patents expired over ten years ago, but owing to the general control of the telephone business by the Post Office monopoly there has never been any "Independent" telephone movement in that country, and consequently there has for a long time past existed no interest in telephone patents. Referring to the recent decision, the *Electrical Review* says that the judgment is an able exposition of scientific facts, of much interest to English scientists, and places American judges on patent cases in a very favorable light. "It is an able, admirably impartial review of the history of telephone transmitters in relation to science and to patent law. It indicates the tendency of the higher courts of the United States to decide patent cases rather on the broad grounds of the inventor's conception, than on the narrow grounds of the instrumentalities patented.

U. S. Judges Did Well

"The real question at issue in the case was," continues the *Review*, "'Who Invented the Microphone?' And the United States judges have answered the question in the way in which the scientific world (old and new) had already answered it. Hughes invented the microphone, say the United States judges, but they say it in a far more complete way than it has been said in before." The article goes on to trace the manner in which the judges determined that Berliner did not discover the true action of the microphonic contact and that Hughes did. Quoting further from the article, the following paragraph is of much interest: "It is impossible to read this latest judgment on telephone transmitters without recalling the controversy between Edison and Hughes, when the latter published his discovery, and the former claimed it to have been included in his telephone transmitter. It is interesting, too, to compare contemporary comments on this controversy with the conclusion of the United States judges twenty-five years later. 'It appears to us,' we said in our issue of July 1, 1878, 'that Mr. Edison, though very nearly discovering the full significance of the microphone, did not do so. He explained the real nature of the property which he had found to exist in carbon . . . . to be a diminution of resistance in the *mass* of the material. The discovery of the microphone limits it to an effect of the *surfaces of contact*. . . . .Thus it is that Prof. Hughes' discovery explains the true action of Edison's telephone, which is indeed a form, but a disguised form, of the microphone.'" The article concludes as follows: "In recalling a controversy, one of the participants in which is unhappily no more, it is but right to express our belief that the true nature of the facts was eventually recognized by both sides, and that Edison fully appreciated the independence and the value of that discovery of Hughes which United States judges have now proclaimed."

Glasgow's Competition

The two rival telephone concerns of Glasgow have both been talking about themselves lately. The employes of the Glasgow district of the National Telephone Company hold an annual festival, and at the last celebration, held a week or two ago, the vice-president of the company, as chairman, made an address in which he dealt with the Glasgow telephone situation. He said that a year ago there was no doubt that they were face to face with serious difficulties in Glasgow, which were due primarily to the phenomenal growth of the company's business in Glasgow, and, in the second place, to the withholding by the Glasgow authorities of underground privileges which had been so readily granted by municipalities elsewhere. Thanks to the energies of a conscientious and able staff of workers, these difficulties had been overcome, and to-day the company's position in Glasgow was stronger than ever before. With subscribers numbering 12,000, and calls totalling 34 millions per annum, it was clearly proved that their telephone system was of great service to the business community of the city. In Glasgow, however, they had municipal competition. He had always been an admirer of the enterprise shown by the Glasgow corporation, and because they had chosen to take up the telephone business was no reason why they should be denounced. He thought, however, that it was a mistake and had only resulted in so many thousand persons paying two subscriptions instead of one, and the pledging of the credit of the ratepayers for the amount of money required for the undertaking. As they were in competition with the municipality of Glasgow, let them see that it was a friendly competition; let it be competition in the interests of the telephone service; let them vie with the corporation in giving the best possible service and the greatest civility and attention to complaints. If they did that, it would be found that there was room in Glasgow for both telephone systems.

Mr. Bennett's Opinions

The other side of the question was voiced in a public lecture by Mr. A. R. Bennett on telephones in general and the Glasgow municipal telephone system in particular. The lecture was arranged for by the telephone department of the Glasgow corporation, of which (the telephone department, not the corporation) Mr. Bennett is the general manager. Mr. Bennett said that the telephone, under corporation management, is becoming more and more popular in Glasgow. He stated, for instance, that the number of instruments connected to the municipal system now reaches the high total of 8,100, there having been an increase of 4,707 instruments in the twelve months since February of last year. Mr. Bennett denied that the estimates had been exceeded at Glasgow, contending that the additional expenditure had been brought about by the necessity of coping with a far greater demand than had been at first anticipated, and of looking well ahead of immediate requirements. The criticisms to which the department had been subjected were unfair to an undertaking, yet in its infancy, and he considered besides that they were based upon wrong premises. Mr. Bennett described the working of the telephone system, and illustrated his remarks by lantern slides depicting the various parts of the corporation telephone plant. In order to forcibly demonstrate the capabilities of the system, the audience was compelled to listen to bagpipe and cornet music played by performers stationed at the central exchange. The sweet strains of the bagpipes and cornets were made audible all over the lecture hall by means of loud-speaking receivers distributed round the walls.

Keeping Up Their Courage

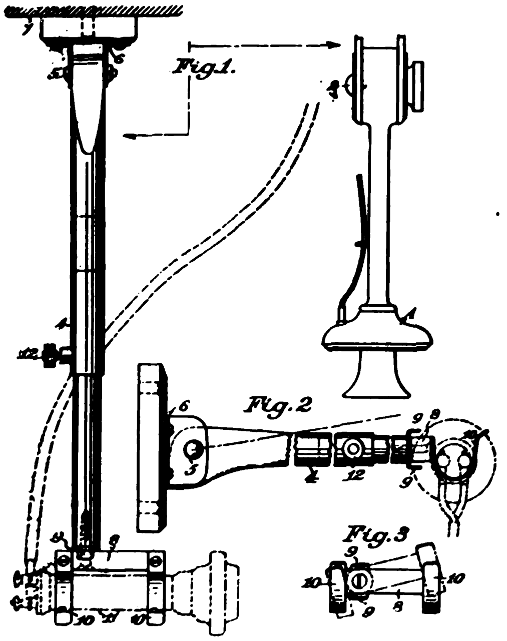
From the above two speeches it looks a little as if both sides of the telephone competition at Glasgow were shouting to keep their courage up. The corporation system is evidently making great headway, as it has already after about two years working got about two-thirds as many telephone stations as the National Company. Working at a lower rate and with local sentiment to aid it is natural that the corporation system should make rapid headway at the beginning. But there is little doubt that the rate has been fixed too low, and that the strain will begin to be felt in the course of a few years, as the amount of capital invested swells, and the working expenses increase. The Glasgow corporation is a rich and powerful body, and, being composed of Scotchmen, naturally possesses Scotch determination (to put it politely) in a concentrated and collective form, so it is not likely to be scared into giving up its telephone undertaking as easily as was the Town Council of Tunbridge Wells. For all that, it will not make an ultimate success of the system, as too many fundamental mistakes have been made. Telephone competition does not seem to flourish under British conditions, and it will be something quite extraordinary if Glasgow should prove an exception.

Patents

RECEIVER HOLDER.

Sigmund Konigstein, of San Francisco, Cal., patents (No. 723,471) a holder for telephone receivers. The holder, which is shown in Figs. 1, 2 and 3, consists of an arm *x*, which is pivoted, as shown, at 5, its point of support being fastened to the wall, as shown at 6.

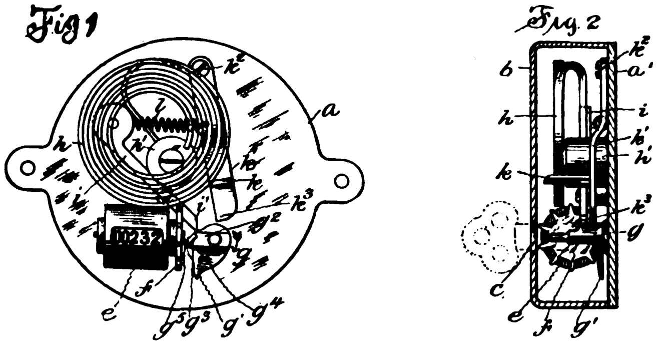
To the end of this arm is fastened a short arm 8, which is capable of being moved in a direction at right angles to arm 4, the amount of its movement being limited by stops 9. This short arm is provided with spring clips 10, shown clearly in Figs. 2 and 3. These clips clamp the receiver, as shown in the figure. The arm *x* is capable of being moved around the pivot 5, thus moving the arm 8, which carries the receiver in the arc of a circle about 5 as a centre. The arm 4 is made up of two pieces, one telescoping into the other, and a set screw 12 being provided for fixing its length as desired. The holder is designed to be fastened to a wall or desk and the receiver to be held by the clips and adjusted to the proper position in the manner described.



COUNTER FOR TOLL CONVERSATIONS.

George A. Long, of Hartford, Conn., patents (No. 723,694) and assigns to the Gray Telephone Pay Station Company, a telephone toll register.

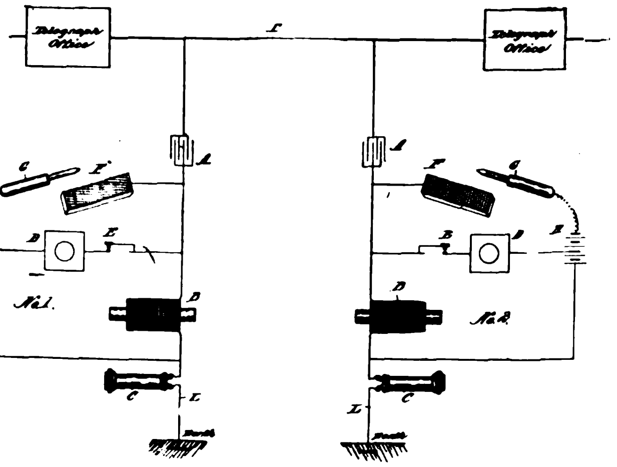
The details of this device, which is intended to be placed at subscribers' stations in order that calls may be registered as they are made, are shown in Figs. 1 and 2. The register consists of a base, *a*, upon which is mounted a register, *e*, and a gong, *h*. A star-wheel, *f*, is mounted on the shaft which operates the dials of the register, and is located so as to be in the path of movement of a tumbler, *g*. This tumbler is adapted to rotate in the direction indicated by the arrow in Fig. 1, and is actuated by a key or other suitable means, mounted on the front of the box, *b*, which encloses the mechanism. To register a call the subscriber turns the key in the direction indicated by the arrow, thus bringing the finger, g^1 into engagement with a tooth of the star-wheel, and at the same time dropping the tail, i^1, of the hammer lever, *i*, into the notch in the projection on the tumbler. Further rotation of the tumbler causes the finger, *g*, to move the star-wheel through sufficient space to cause the dial to register one unit, and the hammer lever, to which is fastened the spring, *l*, slipping out of the notch on the tumbler, flies back, under the influence of the spring, strikes the gong, and gives the signal to the operator, indicating that the call has been registered. The notch, g^3, prevents any reverse movement of the tumbler before the alarm has been sounded, by engaging the end, i^1, of the lever. Back of this lock is another lock, g^4, which is also engaged by the end of the lever, should any reverse movement be attempted after the signal has been sounded. In order to avoid the possibility of sounding the gong by striking the box, the gong is provided with a muffler, *k*, mounted on the base and has a part held in contact with the gong, except when moved out of contact by the movement of the tumbler or some part operated by the tumbler. The muffler shown in the drawing includes a lever, k^1, which is pivoted to the base at k^2, and has its end, k^3, in the path of movement of a projection on the tumbler, g^5. The hammer spring, *l* has one end fast to the hammer lever and the other attached to the muffler lever. The projection, g^5, on the tumbler, moves the muffler lever so as to move the muffler out of contact with the gong before the recoil of the hammer occurs and holds the muffler out of contact long enough to enable a clear signal to be given.



TELEPHONE ATTACHMENT FOR TELEGRAPH LINES.

Edgar Russell, of the U. S. Army, stationed at Washington, D. C., patents (No. 724,336) a telephone attachment for telegraph lines.

The invention, which is shown in the figure, is designed to provide a portable telephone set capable of being quickly connected to a telegraph line at any point along its length and to use that line for telephonic purposes without in any way interfering with its use as a telegraph line. In the figure is shown a sending and receiving station, the apparatus being identical at each station. *T* represents a telegraph line. The connection of the telephone set to the line is through the condenser *A*, inductance coil *B*, and receiver *C*, to earth. The transmitter, *D*, is in a local circuit with a portion of the battery, *H*, the push button, *E*, and inductance coil, *B*, as shown. *F* is a roughened or file cut plate, *G* a metal stylus. When station No. 1 wishes to call station No. 2 the operator at No. 1 draws the stylus across the plate *F* and the battery circuit is rapidly made and broken through the inductance coil *B*. The self-induced currents from the coil cause sudden variations in the potential at the terminal of the condenser, which, acting through the condenser, line *T*, and condenser at station No. 2, cause audible vibrations of the diaphragm of the receiver, thus attracting the operator's attention. This being accomplished, the key, *E*, is pressed, closing the transmitter circuit, and the variation



in current, due to the changes of resistance in the transmitter flowing through the inductance coil, cause self-induced currents in the coil, which in the same manner as in the calling device are conveyed through the condensers and line *T*, and reproduce the conversation in receiver *C*. The current impulses generated in calling are of such short duration that they do not affect the relays of the telegraph lines in their ordinary adjustments. The inventor states that he finds the most efficient inductance coil to be about four inches long, two inches in diameter, and wound to a resistance of four or five ohms, with No. 22 or 23 B. & S. insulated copper wire. The core is about ⅝-in. in diameter, made up of soft iron wires, which project about two or three inches from each end of the coil. The transmitter should be of rather low resistance and the receiver should have a resistance of about 30 ohms. The condenser for distances up to 50 or 75 miles should have a capacity of about one microfarad. The battery for these distances should be about two cells of the ordinary dry type for the transmitter and four for the calling circuit. Any rapid circuit-breaking device may be employed for calling.

SELECTIVE CALL SYSTEM.

Elmer A. Terpening, of Geneseo, Ill., patents (No. 724,219) and assigns one-third to Newhall Atwood, a telephone call system.

This invention, details of which are shown in Figs. 1 and 2, relates to a method to be used by the central office in calling telephone stations, and is particularly applicable to party lines for the purpose of selective ringing. Fig. 1 is a diagram of the ringing circuit of a central office equipped with this system. In the figure *1* and *2* represent the line wires of a metallic circuit, the wiring of a subscriber's instrument being shown at *C*. The ringing circuit by which a subscriber is called is, through wires *1* and *3*, circuit closer *D*, wire *4*, hook switch *6*, wire *7*, and wire *2*. The generator, *A*, differs from the ordinary ringing generator in that it is provided with three spring contacts, *21*, *22* and *23*, which are connected by wires to the stationary contacts, *18*, *19* and *20*. These spring contacts press upon a kind of commutator, *24*, which is provided with an insulating sector, *25*, for the purpose of separating the different portions of the current generated in the armature. The rotation of the commutator brings the springs *21* and *23* into the ringing circuit in such a manner and at such instants that the currents flowing in one direction are collected by the spring, *21*, while those flowing in the opposite direction are collected by the spring, *23*. The spring, *22*, is so arranged that its contact with the portion of the commutator that is connected to the armature coils is not broken by the insulating sector, *25*, and hence the spring, *22*, collects alternating currents. At each subscriber's station, where necessary, is located an automatic circuit closer, *D*, which controls the bell at its station. The circuit closer is provided with an armature, *38*, pivoted at *37*, the armature being polarized by the permanent magnet, *39*, which renders the center of the armature of one polarity and its ends of an opposite polarity. The magnets, *36*, present unlike poles to the two ends of the armature. Immediately above the armature is a yoke, *42*, provided with a weight, *43*, and a contact, *44*. By adjusting the weight at different points upon the yoke the sensitiveness of the armature may be controlled, the position of the weight depending upon the polarity of the armature. The object of the circuit closer is to render the armature sensitive to currents flowing in one direction only and unresponsive to all other currents. This effect is obtained either by varying the polarity of the armatures at the different stations or else connecting the coils of the magnets, *36*, into the circuit in such a manner that the current flows around them in different directions at the different stations. When ringing current, having the proper direction, is sent through the magnets of the circuit closer the left hand portion of the armature, *38*, is attracted by the magnet and its opposite end repelled. This closes the contacts, *44* and *45*, and allows battery *46* to flow through the winding of the drop, *47*, and complete its circuit through wire *38*, magnet *39*, pivot *37*, and contacts *44* and *45*, thus operating the drop *47*, throwing the shutter *50* in contact with point *65*, which completes a local circuit through battery *51* and bell *52*, and thus signals the subscriber. The operator at the central office is enabled to select the required kind of current by means of the switch *17* and contacts *18*, *19* and *20*. Those stations connected to the system which are designed to be signalled by means of an alternating current are provided with the ordinary polarized bell and are not equipped with circuit closers. In order that the alternating current may not affect the armature of the circuit closer, the arm *55*, which is rigidly secured to the yoke and to the armature, extends into a vessel, *56*, containing liquid, and is secured to the piston, *58*, in the cylinder, *57*, this arrangement constituting a dash-pot, which prevents any abrupt movement of the armature due to the momentary impulse of the alternating current, but does not prevent the movement when the current flows continuously in the same direction. The fastening, *41*, upon the arm, *55*, normally allows the spring, *40*, to retain the arm in the position indicated when the weight, *43*, is in the center of the yoke or is removed entirely from the yoke.

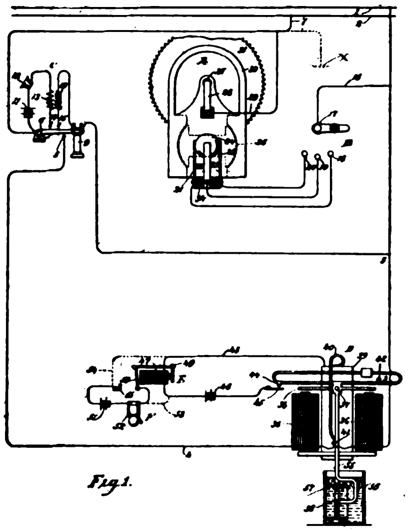


Fig. 1.

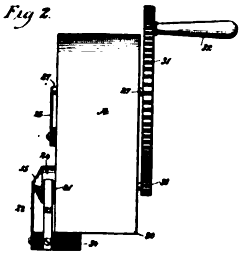


Fig. 2.

Queries

TRANSPOSITIONS.

On a single metallic circuit, 25 to 40 miles in length, what distance is it necessary to transpose? Also what is the best way of transposing the wires?

C. E. A.

Transpose every 1,300 feet unless there are peculiar conditions, such as the paralleling of your circuit by a high-tension circuit. For best way of transposing wires, see articles on "Pole Line Construction," by J. W. Lattig, appearing in the issues of November 22 and 29, December 20 and 27 of THE AMERICAN TELEPHONE JOURNAL.

GROUNDING GENERATORS AND STORAGE BATTERIES.

1. Why are most storage batteries grounded?
2. Why is one side of an alternating current circuit on a ringing generator grounded where the lines are full metallic?

WIRE CHIEF.

1. Storage batteries in common battery exchanges are grounded in order to prevent the inductive disturbances on some lines from affecting others. For example: There are two leaky lines and no ground on the office battery. If one line becomes noisy the parasite currents are likely to affect the other leaky line in their endeavor to seek an earth. The ground at the battery will prevent this.

2. Many exchanges ring ground and talk metallic, or in other words each circuit rings over one side of the line and returns by ground. As this custom is so prevalent, the ringing generators are usually grounded so that a circuit of this discription can always be used. There is no need of grounding the ringing generator if the ringing current is strictly metallic.

The Week's Messages.

FRANCHISES.

NEW ALBANY, IND.—County Clerk Ed V. Fitzpatrick has been granted a franchise for a telephone system at New Albany.

SOUTH WHITLEY, IND.—The Eel River Telephone Company, of North Manchester, and the People's Mutual are both asking franchises with the purpose of establishing exchanges here for lines they have in surrounding territory.

COUNCIL BLUFFS, IA.—The Pottawattamei Mutual Telephone Company, incorporated by F. R. Davis, Cal. Hofer, Charles Beno and others, of this city, has applied for a franchise here.

LAKE PARK, IOWA.—The telephone franchise granted to B. H. Gardner has been sold by him to George E. Ross, of Primghar, who is expected here in a short time to commence work on the exchange. The failure of Mr. Gardner to secure a franchise at Ocheyedan, in connection with the one here, caused him to change his plans, he having purchased the one at Algona for $10,000.

GALESBURG, MICH.—At a recent meeting of the village council an ordinance granting a franchise to the Citizens' Telephone Company was adopted. By it the rates to local subscribers are limited to $12 for residences and $18 for business places, with a provision that when the number of local subscribers shall reach 120, night service shall be provided, at a certain prescribed and reasonable additional rate.

KALAMAZOO, MICH.—The Citizens' Telephone Company has been granted a franchise by the city council.

PLAINFIELD, N. J.—The Central New Jersey Telephone Company, a branch of the Interstate Company, of Trenton, has asked for a franchise here.

CORFU, N. Y.—At a recent meeting of the village trustees permission was granted the Darien Telephone Company to bring its lines into this village.

WOODSTOCK, OHIO.—At a special meeting of the village council the Mechanicsburg Telephone Company applied for a franchise to operate an exchange in the village, and the ordinance was passed. Mr. Rogers, the manager, stated that they would be operating within six weeks.

DENTON, TEX.—The city council has granted a telephone franchise for thirty years to the Independent Telephone Company in consideration of the company's maintaining a fire alarm system and furnishing the city with six telephones.

ELECTIONS.

CERRO GORDO, ILL.—The stockholders of the Cerro Gordo Telephone Company re-elected B. F. Huff, M. Welty, Dr. Yarnell, Dr. Elslager and A. C. Doyle as directors.

TAMAROA, ILL.—The annual meeting of stockholders of the Tri-County Telephone Company was held in Tamaroa. The officers elected for the ensuing year are: President, Dr. J. T. Marlow, Tamaroa; vice-president, C. H. Judd, Belle Rive; treasurer, J. J. Pearce, Ewing; secretary, W. D. Eaton, Tamaroa. Directors for Jefferson County: Dr. Jeffries, Waltonville; Odell Galbraith, Mt. Vernon; O. P. Nesmith, Bluford; C. H. Judd, Belle Rive.

PLYMOUTH, ME.—The Plymouth Telephone Company has elected the following officers: President, A. O. Ward; clerk and treasurer, W. G. Loud; directors, M. J. Dow, H. M. Gage and C. H. Ward; general manager, C. M. Holt.

LOON LAKE, N. Y.—The stockholders of the Farmers' Mutual Telephone Company elected the following officers: President, W. J. Campbell; secretary, Fred Rex; directors of first division, E. W. Owen, William Agad, Fred Rex; second division, R. A. Pierce, F. A. Loveland, Erwin Clark.

HAMILTON, VA.—At the annual meeting of the Snickersville Telephone Company the following officers were elected: President, Eugene Hawling; vice-president, Dr. C. B. Turner; secretary and treasurer, C. H. Osburn; manager, N. B. Warner; directors, H. A. Thompson, George Laycock, R. L. Myers, W. P. Pancoast, R. B. Gardner, George E. Plaster, Jr., J. A. Demana, William B. King, F. G. Carpenter, J. A. Cummings, O. I. Thomas, J. A. Gieman, Eugene Hawling, Dr. C. B. Turner and C. H. Osburn. The company is erecting a long-distance line from Leesburg to Bluemont.

COMBINATIONS.

WELLINGTON, KAN.—The Independent Telephone Company has bought the rural line from the Valley Telephone Company.

MAYSVILLE, KY.—Colonel James W. Chambers, of the Maysville Telephone Company, was in Owingsville recently looking over the system there with a view to purchasing it.

ALBERT LEA, MINN.—The Northwood telephone exchange, it is understood, has opened negotiations looking to the purchase and absorption of the Glenville telephone exchange.

FAYETTE, MO.—A. F. Davis, representing the Fayette Telephone Company, has purchased the exchange and business at Glasgow for $9,000.

FREMONT, NEB.—A meeting of some forty farmers who are stockholders in the Farmers' Telephone Company of Dodge county was held here recently at which it was voted to sell a line extending from Jamestown as far as Hooper to the Fremont Telephone Company. Most of those present also voted to transfer their stock to the Fremont Telephone Company at fifty cents on the dollar. These farmers are the ones who do not like the tie up between their company and the Bell at Fremont, which has shut them out of the other connection they desire with this city and Hooper.

McARTHUR, OHIO.—The Chillicothe and McArthur Telephone Company has sold the line from McArthur Junction to Wilkesville to T. D. Sharp, in the interest of the Vinton County Coal and Mining Company. Later Mr. rp sold that portion of the line extending from Eagle Furnace to Wilkesville to the Independent Telephone Company. Mr. Sharp is putting up new poles and will use new wire from Eagle Furnace to McArthur, and the other end of the line will be rebuilt and a through line opened up from Wilkesville and connected with the switchboard here.

UNDERGROUND

WESTFIELD, N. J.—The matter of placing the telephone wires underground is at present being agitated by Westfield citizens.

FINANCIAL.

MELVIN, ILL.—The capital stock of the Melvin Telephone Company, incorporated, has been increased to $7,500. John Iehl, Bart Holmes, W. E. Thompson and B. F. Kauffman are the directors.

CARROLLTON, IND.—The Carrollton Telephone Company has increased its capital stock to $3,000. Louis J. Weber, president.

WABASH, IND.—The United Telephone Company, operating in Wabash, Huntington, Wells, Blackford and Jay counties, will issue $200,000 in 5 per cent. bonds, already subscribed for at 95 to 98 cents. The money will be used to take up floating indebtedness and to make extensions and improvements.

MORTON, N. Y.—The Rural District Telephone Company, of Morton, has declared a 6 per cent. dividend.

EAST ROCHESTER, OHIO.—The Eastern Ohio Telephone Company, of East Rochester, has increased its capital stock from $5,000 to $25,000. Lewis Walker is president.

RATES.

ELKHART, IND.—The Home Telephone Company, which is putting in a 2,400-line multiple switchboard at a cost of $24,000, has announced an advance of 25 cents per month in the rent of each telephone. The company has 900 subscribers, and the new rate for business houses is $2.25 and for residences $1.25.

THE WEEK'S MESSAGES—Continued

DULUTH, MINN.—The Zenith Telephone Company has presented a communication to the city council asking that body to make an investigation with a view to changes in the company's charter allowing a sliding scale of rates, based upon the number of instruments connected with the exchange.

WILKESVILLE, OHIO.—The Wilkesville and Point Rock Telephone Company, north of Wilkesville, has made an exchange with the Home Telephone Company at Oreton and Wellston, with a toll of 5 cents for each message.

PITTSBURG, PA.—The order issued by the Pittsburg & Allegheny Telephone Company to patrons in Homestead and Braddock that none but county service contracts would hereafter be taken has been rescinded.

COVINGTON, VA.—The Clifton Forge Telephone Company, which has been operating a telephone line in Covington for several years, has increased its rates $5 a year. The telephone users are rebelling against this, and C. W. Rush, president of the Covington Retail Dealers' Protective Association, has called a meeting for the purpose of organizing a company, composed of citizens of Covington, to install and operate a local system.

PERSONAL

JACKSON, MICH.—Frank V. Newman, formerly manager of the Bell telephone exchange in this city, but more recently assistant superintendent at Detroit, will assume the position of assistant superintendent of the Citizens' Telephone Company at Grand Rapids.

LE ROY, N. Y.—Ralph S. Baker, formerly district manager for the Bell Telephone Company at Mt. Morris, has been appointed manager of the Le Roy exchange in place of L. W. Eaton.

ROME, N. Y.—Clifford Wells, who for some time past has been engaged in the telephone business in Newark, N. J., has been appointed temporary manager of the Rome Home Telephone Company in the place of Daniel M. Hall, who resigned to engage in other business.

CONNELLSVILLE, PA.—Harry Wolfe has been appointed manager of the Tri-State Telephone Company in Connellsville, Scottsdale, Dunbar, Ohiopyle and vicinity.

NEWTOWN, PA.—Henry Moorehead, of Philadelphia, is the new Standard Telephone Company superintendent here.

New Construction in the Field

GOODWATER, ALA.—The Goodwater Telephone Company is running wires in all directions and placing telephones at many points.

NEWTONVILLE, ONT., CANADA.—The Independent Telephone Company of this municipality held a meeting here recently at which it was finally settled to build their lines from Newcastle to Kendal, via Newtonville.

CHICAGO, ILL.—The Chicago Great Western Railroad will begin next month the construction of a private telephone system between its three terminal points—Chicago, St. Paul and Kansas City. The first line will be from here to St. Paul, where the general offices of the company are located, and the Kansas City line will connect at Oelwein, Iowa, with the Chicago-St. Paul line. The cost of the telephone system will be about $150,000.

OTTAWA, ILL.—The Ottawa Home Telephone Company expects to be in full operation not later than April 15. C. B. Lloyd and A. H. Allen, of Toledo, president and treasurer of the Northern Construction Company, were here recently inspecting the work already accomplished.

MILTON, IND.—The Citizens' Telephone Company, of Cambridge City, is taking out the ground system here and substituting the metallic system, made necessary by the trolley lines of the Richmond Traction Company.

ORANGE, IND.—The Orange Mutual Telephone Company has the material to begin work on its plant at once. It covers the farming country between Connersville and Rushville. It will begin with about seventy-five subscribers.

ANTHON, IOWA.—Cloid H. Smith, of Odebolt, general manager of the Maple Valley Telephone Company, was here arranging for the construction of the telephone exchange, which he expects to be completed within six weeks. The company has bought the Peiro and connecting lines and is negotiating for the Wetmore line, northwest of Anthon.

GUTHRIE CENTER, IOWA.—The Farmers' Mutual Telephone Company is constructing a new line from Dale to Stuart.

IOWA CITY, IOWA.—The Johnson County Telephone Company will add eighty-two miles of wire to its lines in the immediate future.

JEFFERSON, IOWA.—The Farmers' Mutual Telephone Company, of Jefferson, will build a number of extensions.

MASSENA, IOWA.—The Massena Independent Telephone Company has just started its line from Dewey to Mt. Etna.

LOUISVILLE, KY.—The Home Telephone Company is adding 1,000 new lines to the switchboard. This will give room on the board for 7,000 telephones.

BALTIMORE, MD.—The Southern Maryland Telephone Company has about completed plans to extend its service throughout the counties of Southern Maryland. It now has connections with Drum Point, Calvert county, and Leonardtown, St. Mary county, and in a short time expects to have connection with every village in that section of the State. Arrangements, backed by parties connected with the Maryland Telephone Company, have been made with companies on the Eastern Shore to extend the service throughout the peninsula.

OAKDALE, MO.—A new telephone line, to be known as the Lenhart telephone line, is to be built in the near future. It starts near Lenhart Chapel and goes to Brookfield.

PROSPECT GROVE, MO.—The Granger Telephone Company is building another line through this neighborhood.

UNIONSVILLE, MO.—The Western Telephone Company has ordered a new switchboard, which has a capacity of 560 lines. The old one was but of the capacity of 290 lines. Charles Ward is the manager of this company.

FLATWILLOW, MONT.—E. C. Baxter, treasurer of the Flatwillow Telephone Company, announces that a new line is to be built between Twodot and Harlowton.

CASSVILLE, N. Y.—At the telephone meeting of the several lines running into Clayville it was decided to have a central office at that place. W. L. Davies will furnish an office and put in a 50-drop switchboard.

FREEPORT, L. I., N. Y.—The New York and Long Island Telephone Company is about to extend its line from Freeport west to Jamaica and east to Babylon, and expects to have the line in operation by fall.

FULTON, N. Y.—The Fulton Telephone Company is making many changes at headquarters, including a new switchboard. The number of subscribers has increased so that the old board will not accommodate all.

LE ROY, N. Y.—The work of installing the Inter-Ocean Telephone system is being rapidly pushed forward. It is expected the exchange will be in working order by the last of May.

ONEONTA, N. Y.—The Oneonta Telephone Company is constructing a line to Laurens, and already has the poles set and the wires strung to West Oneonta.

PULASKI, N. Y.—The Empire Telephone and Telegraph Company is arranging to build a line between this village and Richland and thence to Orwell. The poles are being distributed.

RIDGEWAY, N. Y.—The Rural Telephone Company is rapidly finishing the line from Lyndonville to Medina via Ridgeway.

ROCHESTER, N. Y.—Arrangements have been made between the Inter-Ocean Telephone and Telegraph Company and the Home Telephone Company, of Batavia, by which the latter company becomes connected with the former.

SARATOGA SPRINGS, N. Y.—The work of extending the lines of the Saratoga Telephone and Telegraph Company from the Springs to Schuylerville and Greenwich will be commenced shortly.

NORTH LEWISBURG, OHIO.—The North Lewisburg Telephone Company contemplates building a couple of farmer lines this spring. Notwithstanding the fact that the company has only been in operation about eighteen months, the present switchboard capacity is about exhausted.

THE WEEK'S MESSAGES—Concluded.

URBANA, OHIO.—It is understood that the Urbana Telephone Company has purchased a lot and will erect its own building some time in the future, the present headquarters being entirely too small to accommodate the increase of business.

PHILADELPHIA, PA.—The United Telegraph and Telephone Company is putting in a branch exchange at Burnham, and is also erecting a new line to Harrisburg.

WINNSBORO, S. C.—The Winnsboro and Ridgeway Telephone Company is extending a line to Blythewood. It may connect with the Columbia exchange some time in the future.

JANESVILLE, WIS.—Janesville is to have a telephone connection with Rockford, Ill., by an Independent line. This is the purport of a statement made by H. H. Clough, vice-president of the Home Telephone Company in Rockford. Poles have been ordered, and this spring operations will begin with a view to extending the long-distance service of the Rockford exchange throughout Winnebago county.

PERRY, KAN.—J. J. Cox has connected his Perry and Lecompton telephone exchange with a wire of his own, and this gives two lines now between the two towns.

CAMERON, W. VA.—The Cameron Telephone Company has just installed a new switchboard in the exchange here.

TELEPHONE TRAGEDIES.

THE possibilities of the telephone in tragedy are shown by a supposedly true story that is going the rounds, bearing a Chicago date line. The story is built around the death of Harry Eastwood, of Laporte, an employee of the Michigan Central Railroad in Chicago. The mother and sister of Eastwood constitute the night operating force at the telephone exchange in Laporte. The sister made connection for the Chicago coroner to talk with the Laporte chief of police. Going in on the line to see if the parties were talking, she overheard the announcement that her brother had been killed and the remains horribly mangled. Half frantic, the girl told her mother at the switchboard by her side what she had heard. Both became violently hysterical. Their agonized shrieks were heard over the line by the chief of police, who hurried to the office, fearing a tragedy.

At the Michigan City telephone exchange a similar scene occurred. Eastwood's sweetheart is a night operator at this office. She heard the news in a similar manner, became hysterical and stopped the business of the exchange for a considerable time.

HOW TO KILL THE "KICKER."

EVERY telephone manager has more or less trouble with petulant subscribers who heap abuse upon the operators and malign the service in general. The successful efforts of a Washington, D. C., manager in shutting off one of these "kickers" may give Independent managers some valuable pointers.

It appears that about a year ago there was an obscure clerk in one of the government departments in Washington who had a reputation among the operators in the exchange for being the most abusive "kicker" in the city. He finally became so brutal whenever he made a call that the operators always turned him over to the chief operator. The latter gave him her best attention, and tried every means in her power to placate him. But it had absolutely no effect.

The chief then reported him to the manager, telling the latter that the majority of the operators refused to answer the calls of this particular "kicker."

The manager told the chief operator to call him the next time the man rang up. This she did, and the manager, imitating a feminine voice as nearly as he could, asked: "What number, please?" Hardly had the manager said this than the man began. The manager listened for five minutes to a string of vile and abusive language that would have done credit to an old Mississippi River steamboat pilot. He understood stenography, and took down, word for word, all the "kicker" said.

Then he had a copy made, and sent it to the head of the department in which the clerk was employed, with a latter saying the abuse must be stopped immediately or telephone connection with that department would be discontinued. The head of the department had long waited an opportunity to catch this particular clerk red-handed, as he was none too fond of him.

To-day this clerk is noted as the meekest and most polite telephone user in the National Capital.

TRADE NOTES

THE MEDORA MILLING COMPANY, Medora, Ind., has a very large stock of chestnut poles in long sizes. This company is doing a large business and has nearly exhausted its stock of the smaller lengths.

THE CENTRAL ELECTRIC COMPANY, Chicago, Ill., has published a new telephone price list, dated April, 1903. It contains a complete line of telephones and telephone parts and construction material of every description. A copy will be sent upon application.

LINDSLEY BROTHERS COMPANY, of Chicago, Ill., has purchased all of the cedar poles on 3,000 acres of land near Thompson's Spur, Kootenai County, Idaho. The purchase price was about $20,000, the transaction being made on a stumpage basis. It is estimated that there are about 40,000 poles on the tract.

THE CONNECTICUT TELEPHONE & ELECTRIC COMPANY, Meriden, Conn., is sending out its new catalogue No. 7. This catalogue shows many new styles and a large number of improvements. Among these may be mentioned the company's new solid back transmitter, equipped with a new resonating chamber; a new self-contained receiver and hook switch, a new style switchboard and many new telephone sets. The company's prospects for the year are exceptionally bright, a large number of big contracts being already booked.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY'S Chicago factory is now turning out 1,200 telephones a day. In order to keep up with its extensive business, the company feels that its factory will have to be increased to a considerable extent. The company has recently sold telephones and material to the Farmers' Telephone Company, at Windsor, Ill.; Green Valley Telephone Company, Green Valley, Ill., and the London Mills Telephone Company, London Mills, Ill. Switchboards have been sold to the following: Rossville Home Telephone Company, Rossville, Ind.; West Virginia Western Telephone Company, Parkersburg, W. Va.; Winchester Telephone Company, Winchester, Ind.; S. S. Hooks, Gilmore, Ill.; J. W. Corin, Dahlgren, Ill.; Newport Telephone Company, Newport, Tenn.; E. P. Phillips, Lakenan, Mo.; Zenith City Telephone Company, Duluth, Minn.; O. I. Miller, Woodburn, Ore.

THE WESTON ELECTRICAL INSTRUMENT COMPANY, of Waverly Park and Newark, N. J., has established a New York office at 74 Cortlandt street for the greater convenience of its numerous customers and to better care for the continued increase of business in New York and vicinity. This office will be under the management of Mr. Caxton Brown, who has a theoretical as well as a practical knowledge of the different instruments manufactured by the Weston Company and their particular adaptabilities. This will enable any purchaser or any person visiting or doing business in New York who may wish to make inquiries relative to electrical measuring instruments to come in direct contact with a man who is properly qualified to answer such inquiries. There will be a show room in connection with the New York office, in which will be exhibited the different types of Weston instruments and their special advantages, also the individual parts which make up the instruments. Besides being of great convenience to customers, the New York office will eliminate much correspondence in the nature of inquiries, thus reducing time of delivery of orders. A general impression has prevailed that the Weston Electrical Instrument Company only makes voltmeters and ammeters, which is not the case. Having what are credited with being the largest and best equipped works in the world for the production of electrical measuring instruments of all kinds, the company is particularly fitted to turn out work of any special character, in which the highest excellence of mechanical and electrical work and design are the important features. It has, in fact, been turning out a large amount of special laboratory apparatus for several years past, and is now prepared to make standard cells, standard resistances, galvanometers and the highest grade of special bridge work, speed indicators, etc.

The American Telephone Journal

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THE GERMAN IMPERIAL TELEPHONE SYSTEM

By Max Staengel.

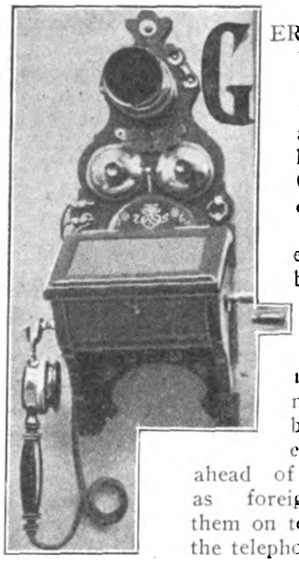


FIG. 3—WALL SET.

GERMANY'S telephone service is far behind our own in the matter of speed, equipment and general convenience, but from the general manager's point of view, some valuable lessons may be learned from the Germans, particularly as to the present absorbing topic of rates.

The service is entirely under Government control, being operated as a branch of the Imperial Telegraph Department. To the fact that the Government monopoly makes competition impossible, the backwardness of the system from an engineering standpoint is undoubtedly to be ascribed. In the open fields of electrical work the Germans are well ahead of the times, individual as well as foreign competition having spurred them on to exceptionally good work. But as the telephone is closed to individual enterprise and as the Government is not allowed to go into the foreign markets for its equipment, there is the lack of progress usually to be found under such conditions. The photographs shown with this article give a very fair illustration of the difference between telephony in the Empire and telephony as we are accustomed to find it here under the impetus of the development that has come out of the Independent movement.

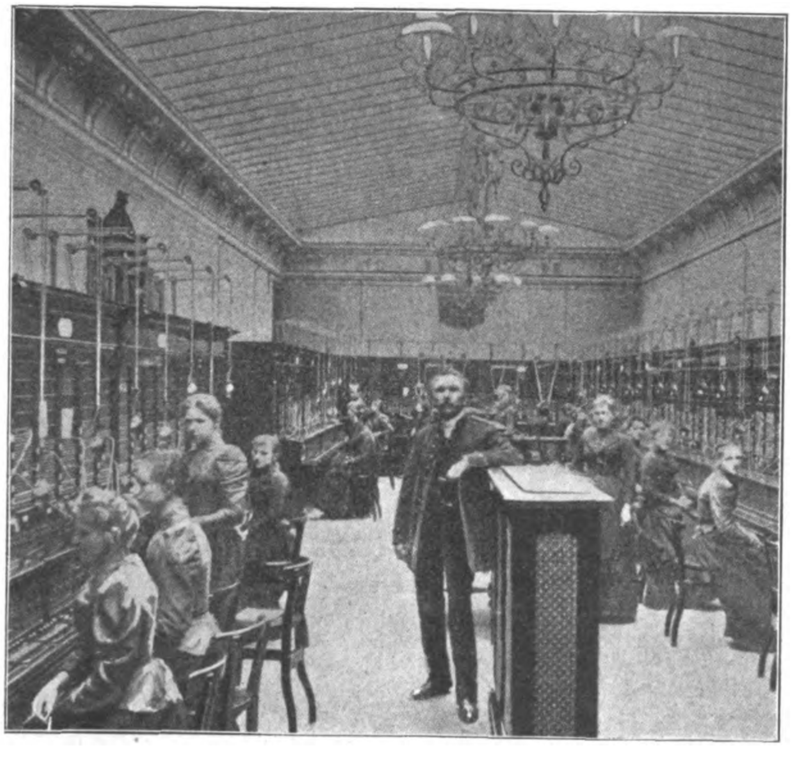


FIG. 2—THE HAMBURG EXCHANGE.

The principal exchange in Chemnitz, one of the most important manufacturing cities in the Empire, is illustrated in Fig. 1. Here is the old form of flat-top board, the jacks arranged in the center, the plugs standing about the periphery and operated by a call wire. This type of board is of the ancient Law pattern, one of the earliest forms used in the United States. Before the resistless march of the branch terminal and the lamp signal, this style of board has vanished from American practice, though it by no means needs the memory of the oldest inhabitant to recollect when service was exclusively performed with such an installation in several cities, particularly Philadelphia. The photograph shows that the Chemnitz exchange can hardly be called a busy one, if judged by American standard, for on tables supplied with 16 operators there are not a dozen cords up. An American chief operator would cut all the positions together, and a single operator would easily handle the entire business.

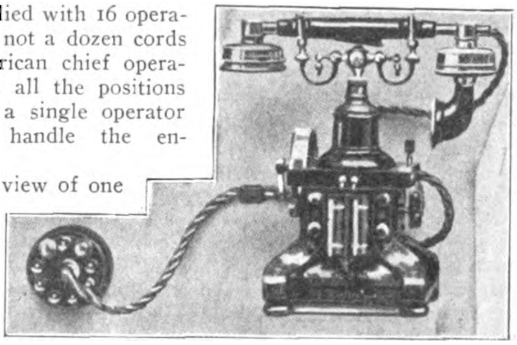


FIG. 5—PORTABLE DESK SET.

In Fig. 2 a view of one of the Hamburg exchanges is given. A more modern type of switchboard appears, but the old-fashioned double-deck remains, carrying the keys and drops in the lower portion, while the answering jacks and plugs are above—a practice that American speed has condemned and long ago relegated to the scrap heap, for the last board of this description was discarded in Chicago some four or five years since. Evidently the Hamburg exchange is hardly over-loaded, for the operators have plenty of time to have their pictures taken, an impossibility in a modern American office, even to the flashlight or snap-shot photographer. It is worthy of note that the German operators do not come up to American ideals.

In the matter of their instruments the Germans are somewhat more advanced than in their switchboards. But even here the advance is very much on the surface, for in practical working there is not a receiver or transmitter to be found in the Imperial service that compares in efficiency with the best American types. The Government is not committed to the use of any particular type, allowing a very wide latitude in this respect to the firms that make the apparatus. One of the favorite types is shown in Fig. 3. So far as outward appearance goes, this instrument would compare very favorably with some of the best American makes, but the spoon handle receiver in general use abroad would fit awkwardly to American ears. The intercommunicating desk set shown in Fig. 4 is not particularly different from many similar installations here, except that with us automatic signal circuits have entirely replaced hand generators, even in speaking tube sets.

The favorite German portable desk set is shown in Fig. 5. For ornate elaboration there is nothing to match this in America, as our practice exclusively tends to making apparatus of this description as simple, as solid and substantial as possible, and the microtelephone, as the combined transmitter and receiver is termed, has always been found very unpopular in this country.

Outside of an occasional semi-theatrical telephonic exhibition in which transmitters are placed upon the stage of some concert or opera hall, there has been no demand in America for the loud speaking instruments that are quite common in Europe. In this the Germans have carried the development of transmitters and receivers far beyond other practices, and regularly produce apparatus capable of repeating conversations spoken in the ordinary course of business in one room in such a manner as to be perfectly audible all over another similar office.

To secure uniformity, an exceedingly voluminous and elaborate set of rules is prepared under which German telephone service is carried on. Some of these admirable regulations are abstracted.

Prior to the installation of any telephone, a written consent from the owner of the premises in which the instrument is to be placed, must be obtained, whether he is the subscriber or not. This consent must give specific authorization to install all of the fixtures, wires and instruments which may be necessary for the sub-station, and no transfer of instruments from one building to another is allowed, excepting upon a confirmation of such a permit.

Every subscriber is entirely responsible for all the apparatus which may be installed under his contract, and is required to make good all injuries of whatsoever nature, and is also required to prevent any interference with, or introduction of, additional instruments in any portion of the circuit.

Each subscriber is responsible for all communications which are transmitted from his instrument, whether by himself or other parties who may use it.

The telephone management specifically reserves to itself the right to suspend telephonic connection without damages to the subscriber, either on account of failure on the part of the subscriber to promptly pay the tariff, or in case of any injury to the circuits and apparatus of the exchange.

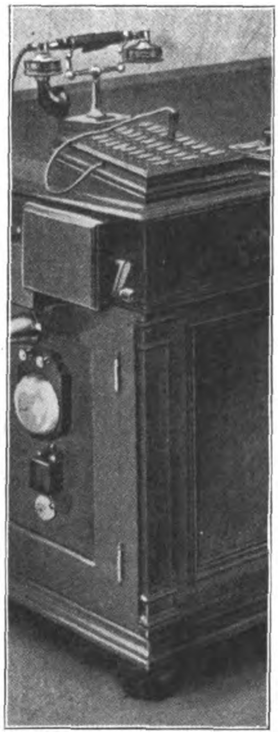


FIG. 4—INTERCOMMUNICATING DESK SET.

Contracts are made for the period of a year, but there is an express stipulation that unless specific notification is sent requesting the removal of the sub-station 60 days prior to the expiration of the contract, the regular tariff will be charged and may be collected for so long a period after the expiration of the contract as the instrument may remain in the subscriber's premises.

Telephone service is divided into three classes:

First, what in this country would be termed local service, that which is given between the subscribers to a single exchange.

Second, suburban service, that which is here usually termed toll line service, namely, communication between exchanges which are located at short distances from each other.

Third, service which corresponds to our long distance work, such as intercommunication between large cities over considerable lengths of line. Tariff schemes recognize each of these subdivisions.

Subscribers at pleasure may obtain service either upon a flat rate basis or by measured service methods, but the German tariff recognizes that there should be a change in rates with the size of the exchange, thus the following table shows the variation in flat rates with the size of the exchange:

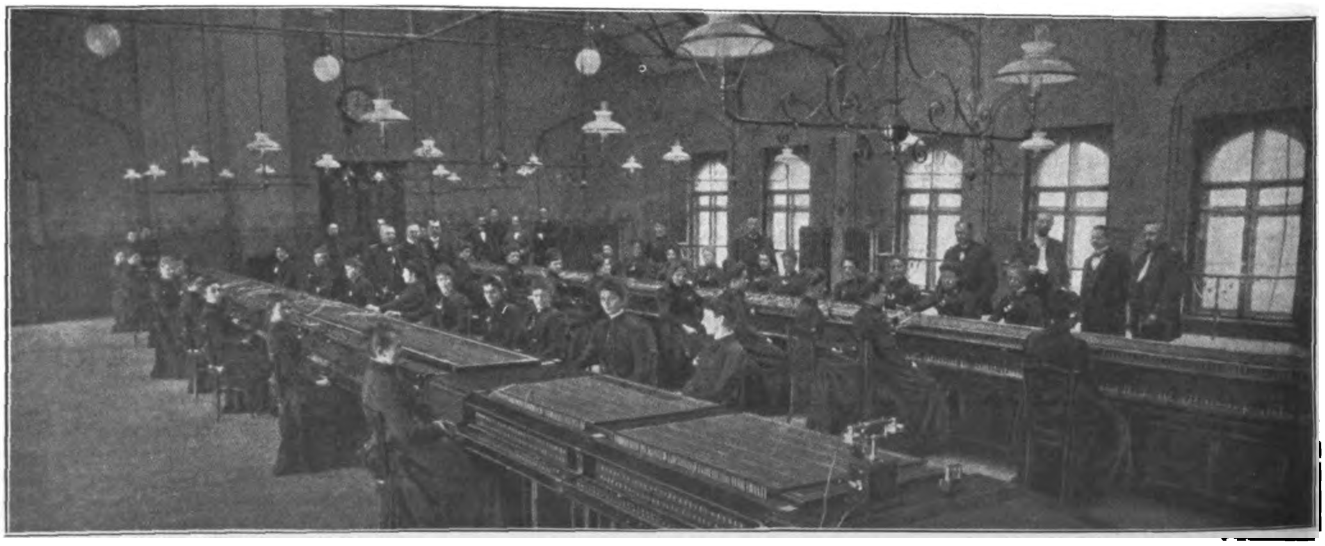
Number of subscribers.	Annual flat rate.
50	$20.00
50— 100 incl.	25.00
100— 200	30.00
200— 500	35.00
500— 1000	37.50
1000— 5000	40.00
5000—20000	42.50
20000	45.00

The preceding rates apply to all sub-stations that are not more than three miles away from the central office. Wherever an instrument is installed at a greater distance, an additional charge of 75c. for grounded lines and $1.25 for metallic lines is made for every 300 feet of additional line length. The measured service schedule is based upon the annual prepayment of $15.00 for each station in exchanges for 1,000 to 5,000 subscribers, $22.00 in exchanges from 5,000 to 20,000, and $25.00 in exchanges over 20,000. This schedule of rates covers the depreciation and maintenance of the subscriber's sub-station. In addition, each message in the day time is charged at the rate of 1½c. and at the rate of 5c. at night, and each subscriber must agree to make not less than 400 calls per annum.

Toll line charges for suburban messages are at the rate of 5c. for each call, whose duration is not over 3 minutes. If more than 3 minutes' conversation is desired, the rate is 5c. for each additional 3 minutes. Subscribers who prefer the flat rate are allowed suburban service free provided they pay an annual charge of $50.00. Long distance charges for 3 minutes' conversation are at the rate of 5c. for 15 miles or under; 6c. for 30 miles; 12c. for 60 miles; 25c. for 500 miles; 50c. for 1,000 miles or over.

A feature of German service is the rush call. For example, if a subscriber wishes a connection as quickly as possible, he can, by paying three times the regular tariff, take precedence over all other orders that are not similar rush calls; otherwise all mes-

FIG. 1—THE CHEMNITZ EXCHANGE.



sages are handled in regular order. All connections are limited to 6 minutes unless by special arrangements.

Either flat rate or measured service subscribers are at liberty to permit the use of their instrument to any other parties if they desire, and are at liberty to collect and retain from third parties the regular telephone fees for such messages.

Subscribers who desire additional apparatus, such as extension bells, ringers, additional telephones and private branch exchanges, must purchase all apparatus of this description outright at the regular manufacturer's prices; such appliances become the property of the subscribers. The telephone management will then install the instruments thus purchased.

Additional ringers are installed for 75c. per year, and an extension set for $1.25 per year. Private branch exchanges located on the same property are installed at the annual rate of $4.00 for every station, while such stations not in the same property that will require more than 300 feet of line must bear a charge of 75c. annually for every additional 300 feet if grounded lines and $1.25 if metallic ones.

Calls from public telephones not exceeding 3 minutes to subscribers within the same exchange bear a tariff of 2½c., while for suburban calls the rate is 4c. For long distance calls the rates are the same as have already been specified.

The table below shows about one telephone for over 3,000 persons in the empire, whereas in the United States there are at least 10 times as many per capita instruments. The number of messages handled last year was in round numbers 700,000,000, of which 100,000,000 were toll messages and about 2,000,000 public telephone and pay stations. The increase in telephonic messages last year amount to about 10 per cent. of the total business. Telephony in Germany furnishes employment to nearly 20,000 persons, of which some 4,400 are operators (women).

GERMAN TELEPHONE STATISTICS.

According to the Statistical Bureau of the German Government the telephonic industry stood as follows at the beginning of the current year:

Miles of urban telephone lines	31,400
Miles of interurban telephone lines	19,300
Miles of special lines	978
Wire plant under German control exterior to the Empire, as follows:	
Miles of line	19
Miles of special line	28
To serve preceding line mileage, the following wire mileage is required:	
Wire miles, urban lines	485,000
Wire miles, interurban lines	158,000
Wire miles, special lines	5,420
Outside of Empire:	
Wire miles	145
Wire miles special lines	72
Total wire miles	648,637

Of the urban wire mileage there are 145,000 miles of wire in conduits.

The number of instruments installed is as follows:

Subscribers' stations	230,993
Extension instruments	57,899
Pay and public instruments	2,943
Total	291,835

CONTEMPORARY CROSS TALK

By "The Listening Key."

THE explanation of a curious phenomenon, the bitterness of telephone complaints as compared with complaints relating to other services, a phenomenon that must be familiar to every telephone man, is to be found in two simple facts. The first is that the telephone is used directly and individually by the customer. He is alone with the machine, and the machine becomes for the time being practically a part of him—the sole instrument and means of expression for the moment of his thought and desire. Therefore, if anything goes wrong, it touches him more nearly and acutely and impresses itself more strongly than a lapse that occurs when he is a joint sufferer with a number of others. If one is in a blocked street car or a broken-down train it is an exasperating delay, but being shared with others it is nothing like so exasperating as having a break down when one is out in one's own automobile. The delay and irritation then are all direct, individual and undivided. It is much the same with the telephone. When there is a delay there is but one solitary sufferer, and he feels as if his whole life were being held up for the time being.

Errors Usually Irremediable

The second reason for the deep and lively feeling which accompanies telephone complaints is that telephone errors are usually complete and very often irremediable. If, for example, we get a letter or a message which is badly expressed or in which some words are ambiguous or even undecipherable, generally the whole meaning is not destroyed or changed, and we are able to make a fairly good guess at the real meaning. The same with telegrams. Mistakes often occur in telegrams through bad writing, careless signalling or reading, line and instrument troubles, and so forth. But if a word in a telegram in open language comes wrong we are generally able to guess from the context what the word should be. Seldom is a telegram, unless in code, so mutilated as to be unintelligible and, therefore, useless. But if a telephone call is switched on to the wrong number or if, for any other reason, it does not quickly and effectively get through to the *right* number, it is completely and entirely useless. There is not any question here of an error where the correct meaning can be guessed at, but the whole transaction fails entirely and becomes null, void and without issue or result.

Then, again, in very many cases a telephone call fails entirely of its object unless it is effectively completed quickly. A very large proportion of telephone calls are urgent in every sense of the word, requiring something to be done or some information to be conveyed within a given time. Very many telephone calls are directed to a particular person and with a very narrow margin of time; if the connection is not completed quickly the person may be gone and the message lost and its object frustrated. In all such cases the call is absolutely useless unless it is put through without appreciable delay. So that in the use of the telephone a delay or error that would be negligible in the case of a letter and hardly noticeable even in the much more rapid telegraph service completely destroys the value of the message; and this often occurs even when the caller has done all the work necessary on his part to put through a successful message.

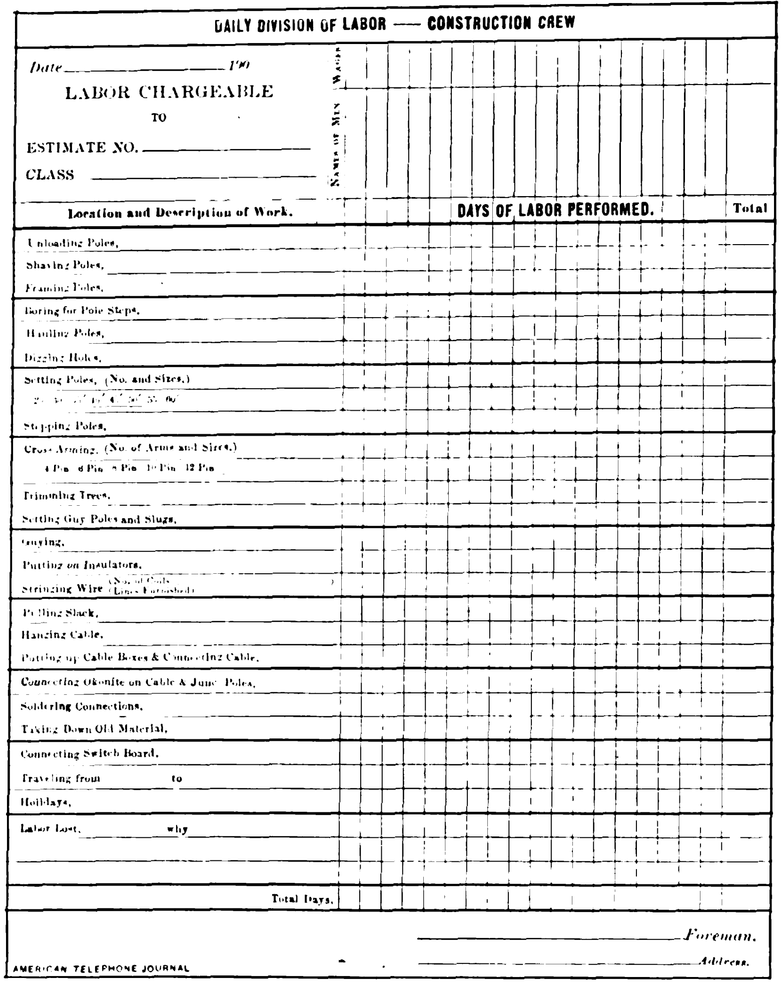
A High Standard Demanded

All of these trite reflections, which must have occurred to most telephone men, go to explain why it is that the telephone user resents so acutely and so bitterly any failure of the telephone service, why he tends rather to exaggeration in stating his complaints and why he demands from the telephone company a higher standard of efficiency and performance than he exacts of any other of his numerous servants. He certainly does demand this, and, as a general rule, he gets it. The average member of the public is more or less bullied and imposed on by very many of the concerns that serve him and take his money. The post-office delays and misdelivers his letters; the telegraph companies delay and mutilate his telegrams; the street-car companies jostle him and crowd him, "car-ahead" him, block him and otherwise maltreat him; cabbies rob and swindle him; the railway companies make him keep to their time tables, though they do not keep to them themselves, and, occasionally, they add injury to insult by breaking the journey and the passenger's bones at the same time.

INSTRUCTIONS TO FOREMEN FOR KEEPING ACCOUNTS

By Wm. H. Hyde

UNIFORM plan to enable the foremen of construction crews to render accounts is essential and the following specific instructions are offered for the purpose:



DAILY DIVISION OF LABOR — CONSTRUCTION CREW

Date ________ 190

LABOR CHARGEABLE

TO

ESTIMATE NO. ________

CLASS ________

Names of Men

Wages

Location and Description of Work.

DAYS OF LABOR PERFORMED.

Total

Unloading Poles,

Shaving Poles,

Framing Poles,

Boring for Pole Steps,

Hauling Poles,

Digging Holes,

Setting Poles, (No. and Sizes.)

25' 30' 35' 40' 45' 50' 55' 60'

Stepping Poles,

Cross Arming, (No. of Arms and Sizes.)

4 Pin 6 Pin 8 Pin 10 Pin 12 Pin

Trimming Trees,

Setting Guy Poles and Slugs,

Guying,

Putting on Insulators,

Stringing Wire (No. of Coils / Lines Furnished)

Pulling Slack,

Hanging Cable,

Putting up Cable Boxes & Connecting Cable,

Connecting Okonite on Cable & Junc. Poles,

Soldering Connections,

Taking Down Old Material,

Connecting Switch Board,

Traveling from ________ to

Holidays,

Labor Lost, ________ why

Total Days,

________ *Foreman.*

________ *Address.*

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FIG. A—LABOR SHEET.

First. A labor sheet should (see Fig. A) be made out for each day's work and mailed to the Superintendent of Construction each evening Care must be taken to give full details as to the number of poles of different lengths set each day, the number of guy stubs and length; the number of anchor rods, the amount of wire strung, and the number of cross-arms, of each size.

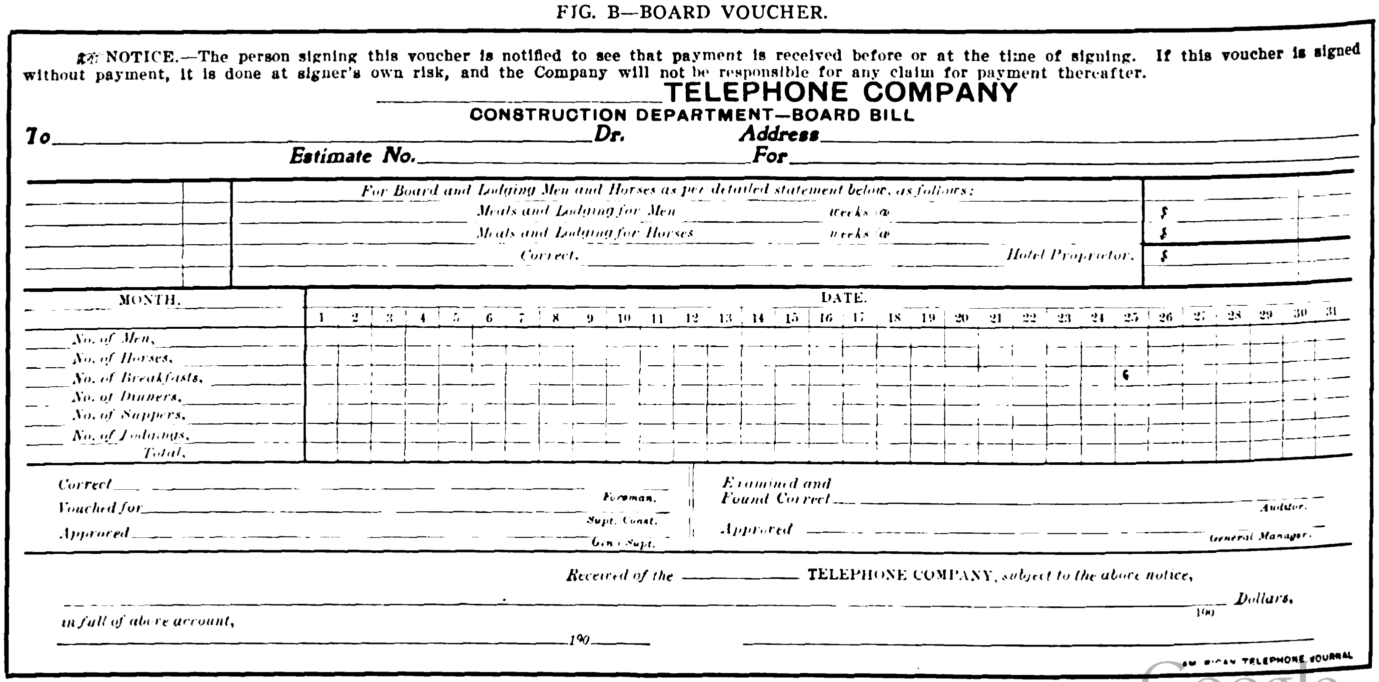
Second. In case of sickness or accident the employee's name should be dropped from both the labor sheet and time book during the time he is not actually at work, and a detailed report of the accident (no matter how trivial) made out and mailed immediately to the Superintendent.

Third. Time books should be written up daily and should agree with the labor sheet. On the last day of the month the number of days should be carried out and in the proper column, opposite each name, the rate of wages to be paid and the extension showing the amount actually due each man, properly figured out. In case employe is paid by voucher this fact should be written in the proper column.

Time books should be sent in not later than the second day of each month. The time books must show the number of men and days employed on *estimates, new subscribers,* and on *repair work,* separately. It is advisable to use a separate time book for each job. When an estimate is completed send in the time book at once to the Superintendent of Construction, and begin a new job with a *new* time book.

Fourth. Vouchers should be used as a receipt for all expenditures, and should be receipted in *ink* by the parties to whom money is paid. The signatures for companies should be, for example: "American Express Co., per Jno. Jones, Agt." These small vouchers should be summarized on a summary voucher and receipted by foreman, and the summary voucher sent in with small vouchers attached, to the Superintendent. Foremen will be provided with a certain amount of expense money when they start out, and same charged up to their expense account. A check will be sent for each summary voucher that is returned in so that the original amount of money advanced for expenses will always remain the same. (This does away with the continual checking up of expense accounts.) Foremen should head the summary voucher: "For Expenses as per vouchers attached," and write in the date, to whom paid, and the total amount, for each voucher—summarizing the different amounts—and receipt for the total amount of the voucher. Foremen should always write across the face of the summary voucher

FIG. B—BOARD VOUCHER.



☞ NOTICE.—The person signing this voucher is notified to see that payment is received before or at the time of signing. If this voucher is signed without payment, it is done at signer's own risk, and the Company will not be responsible for any claim for payment thereafter.

________ TELEPHONE COMPANY

CONSTRUCTION DEPARTMENT—BOARD BILL

To ________ *Dr.* *Address* ________

Estimate No. ________ *For* ________

For Board and Lodging Men and Horses as per detailed statement below, as follows:

Meals and Lodging for Men ________ *weeks @* ________ $

Meals and Lodging for Horses ________ *weeks @* ________ $

Correct. ________ *Hotel Proprietor.* $

MONTH.	DATE.																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
No. of Men,																															
No. of Horses,																															
No. of Breakfasts,																															
No. of Dinners,																															
No. of Suppers,																															
No. of Lodgings,																															
Total,																															

Correct ________ *Foreman.*

Vouched for ________ *Supt. Const.*

Approved ________ *Gen'l Supt.*

Examined and Found Correct ________ *Auditor.*

Approved ________ *General Manager.*

Received of the ________ TELEPHONE COMPANY, *subject to the above notice,*

________ 100 *Dollars,*

in full of above account,

________ 190 ________

AMERICAN TELEPHONE JOURNAL

the specific work upon which the expense was incurred.

A special meal roll or board voucher will be furnished the foremen to be filled out, showing number of men and teams, number of days, and number of meals and lodgings, to be used as a receipt for board. (A good form of board blank is shown in Fig. B.)

Fifth. Foremen should have hotel proprietors certify all meal rolls that are to be paid by check before sending them for payment.

Sixth. As soon as a job is completed foremen should return to storekeeper all material left over and send in a list of the material shipped, to the Superintendent. If any material is left with the local manager a receipt should be taken for same and mailed to the Superintendent, so that he may know just what material has been unused.

Seventh. Foremen should keep an account of all material received on each separate job, and report material used or returned in the same manner, so that it will be charged or credited to the proper account.

ECONOMICAL METHOD OF SETTING POLES IN ROCK

By Terrell W. Croft.

In building a line through a mountainous country it is often necessary to place poles in solid rock. To do this, blasting is necessary, an expensive and dangerous proceeding. And after the hole is blown out to the proper depth it is usually funnel shaped, being much larger at the mouth than is necessary. The rock, which has been excavated, is then replaced and tamped down. This gives the pole a good footing, but often when the line is of small capacity the expense is not justifiable.

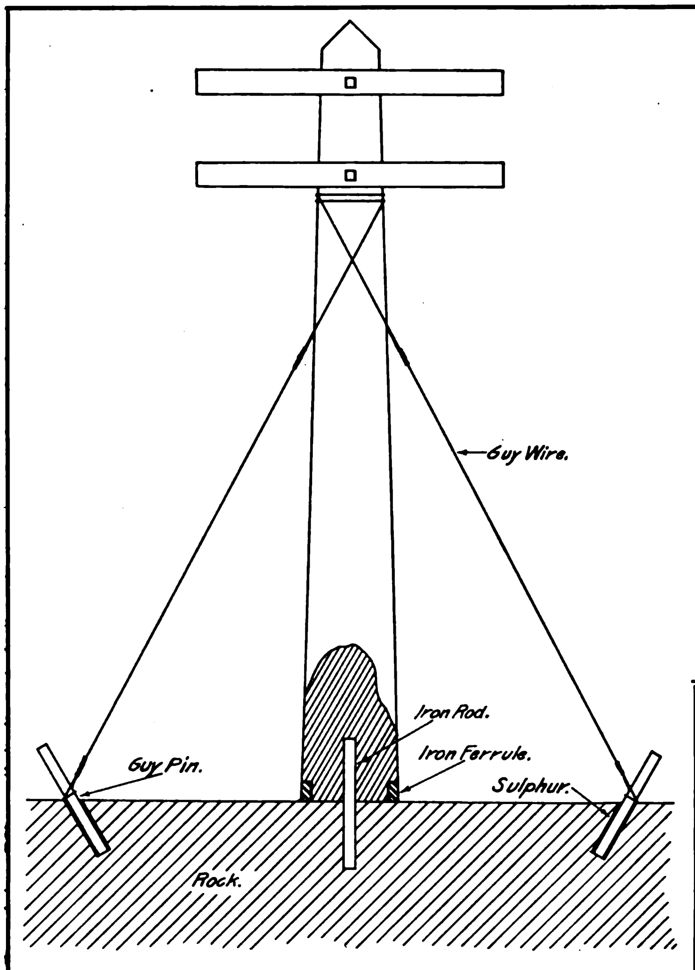


FIG. 1.

Where an economical and secure construction is desired the following scheme will be found efficient. A 1¼ inch hole is first drilled to a depth of about 6 inches into the rock at the point over which the pole is to set, then four more holes 1¼ inch in diameter and 8 inches deep are drilled at convenient distances from the first, two of them being in the plane of the line and the other two at right angles to it. These four holes are drilled at an angle as shown in Fig. 1. In each of these a piece of 1 inch round iron rod is placed, its end being allowed to extend from the mouth of the hole about 8 inches.

An inch hole 6 inches deep is then bored into the center of the bottom of the pole, which has previously been sawed off square, and into it a piece of inch round iron rod about 11 inches long is driven. The pole is now raised into position, the protruding end of the iron rod being placed in the central hole.

The pole is held in position with pikes until guy wires are run from a point under the lower cross arm to each of the four projecting rods and made up around them, as shown in Fig. 2, the guys being pulled as taut as possible.

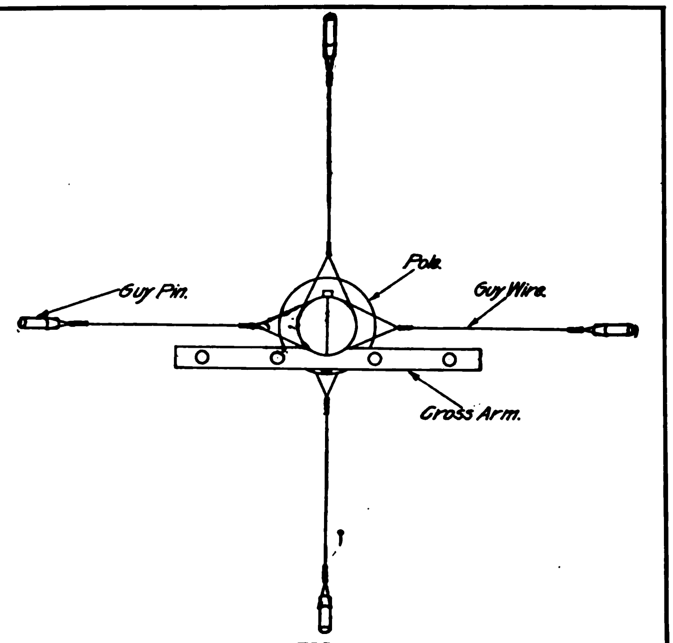


FIG. 2.

To prevent the pole from splitting, a ferule welded from ½ inch by 1½ inch bar iron should be placed around its bottom in a recess provided for it; or in lighter construction wire wound in a groove cut around the pole close to the butt will answer the purpose. The general arrangement of parts is shown in the figures.

The dimensions given, answer very well for a twenty foot pole with an 8 inch butt. For a heavier or lighter installation they could be varied proportionally.

MISSOURI INDEPENDENT CONVENTION

By William H. Elges, *Special Correspondent.*

Independent telephone companies operating in the central part of Northern Missouri held a convention at Unionsville, Mo., recently. The call for the meeting was signed by F. S. Fechtling, chairman, and Platt Husted, secretary of a former convention of the same companies. Each company was represented by one delegate for each ten stockholders or fraction thereof.

The following officers were elected: F. S. Fechtling, president; L. C. Corporan, secretary; J. O. Smith, assistant secretary.

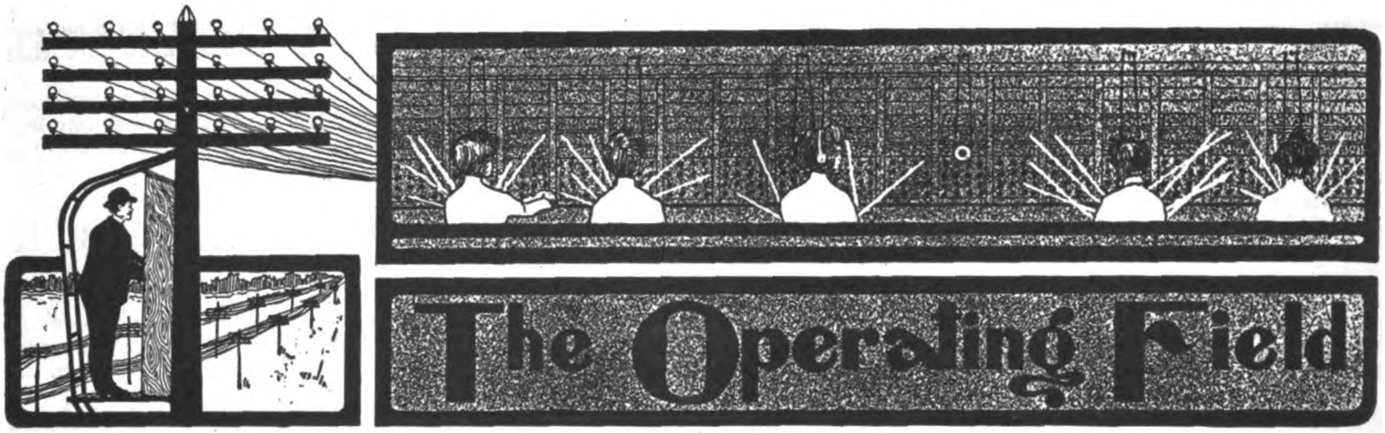
The purpose of the meeting as set forth in the call was as follows:

"To devise some plan for a mutual general exchange among the business men and farmers of the middle part of North Missouri.

"To eliminate all competitive feeling.

"To establish a uniform toll rate for messages."

After a short opening speech by the president, the meeting was thrown open for general discussion. Following this, Pearl Marty presented a resolution designed to fulfil the purposes of the meeting which was adopted. The convention then adjourned.



LOS ANGELES SYSTEM IN OPERATION.

Los Angeles, Cal., now has the service of the Home Telephone and Telegraph Company. The company has issued a preliminary list of the subscribers connected. It contains the names of over 1,000 business houses and dwellings. The list is being added to daily, and as new names are added, a second preliminary list will be issued, and then a third and so on until the nearly 15,000 subscribers the Home Company has secured in Los Angeles are all connected. No charge will be made for service until 3,000 telephones are installed, but from present appearances, the subscribers already connected will not be on the free list for a great length of time. The company requests the subscribers to "use the telephone all you can." The correspondent of The American Telephone Journal in Los Angeles says subscribers are not backward in complying with this request, and the operators of the Home Company, most of whom have been evolved from raw material, are given opportunity for lots of practice.

The Home Company is not confining its operations to Los Angeles. Every week, its representatives appear before the city councils in other California cities asking for franchises. At present they have been successful in nearly a dozen of the most important towns, and by the time the Los Angeles plant is in full working order, these systems will also be using the Independent telephones, and have Independent connection with Los Angeles.

HOME COMPANY'S CENTRAL OFFICE.

Plans for the exchange building of the Home Telephone Company, of Kansas City, Mo., have been finally accepted by the officials of the company, and work on the structure will be commenced within a few days.

The building will be of stone and pressed brick and will be erected at a cost of $75,000. It will be three stories in height and will be occupied only by the Home Telephone Company. Its ground dimensions will be 60 x 115 feet. The building will be ready for occupancy in about four months.

The Home Company now has contracts signed for more than 7,000 telephones. By the time the exchange is put in operation the number will probably reach 10,000. The new system will in all probability be ready for operation by October 1.

KEYSTONE COMPANY'S FINANCIAL STATEMENT.

The Keystone Telephone Company, operating in Philadelphia, Pa., has had its stock listed on the Philadelphia Stock Exchange. The Company applied for this privilege some time ago, but the action has just been taken favorable to the Company by the Board of Governors of the Stock Exchange. Now that its stock is on the open market a detailed statement of the finances of the company has been made public. It shows that the Company has an authorized capital stock of $10,000,000, of which $5,000,000 is 6 per cent. cumulative preferred stock, and $5,000,000 is common stock, the par value of each being $50. The whole of the common stock and 39,067 shares of the preferred have been listed. Such preferred stock as was subscribed for by the public received a bonus of 25 per cent. in common.

The Company has been unable to raise sufficient funds by stock subscription and, therefore, found it essential to go to the market for a loan. A bond issue became necessary and a new company was formed under Pennsylvania laws, the original Keystone Telephone Company being a New Jersey corporation. The Keystone Telephone Company, of Philadelphia, which is the company chartered in Pennsylvania, has a capitalization of $2,500,000, which is common stock at a par value of $50. There are $2,500,000 first mortgage bonds, bearing 5 per cent. interest.

The amount of cash put in the property from all sources is given as $3,353,350, against which there are outstanding in stocks and bonds $9,453,350, without including the $2,500,000 stock of the Keystone Telephone Company, of Philadelphia, owned by the New Jersey corporation.

The statement of the Keystone Telephone Company, of New Jersey, is as follows: Assets, common stock in Keystone Telephone Company, of Philadelphia, 50,000 shares at $87.67 (par value, $50), $4,433,712; first mortgage bonds on same company, $2,500,000, making a total of $6,933,712. The liabilities are: Preferred stock (total, $5,000,000, of which $3,066,287 remains in the treasury), $1,933,712; common stock, $5,000,000, which makes a total of $6,933,712.

The company also makes this statement, showing earnings from the time it commenced charging for service, July 1, 1902, to February 28, 1903: Gross, $180,206; operating expenses, $109,618, leaving net earnings of $70,588.

The total number of telephones operated in Philadelphia is given as 8,718, with between 35,000 and 40,000 connections in Pennsylvania and surrounding States over toll and long-distance lines of other companies.

SUCCESSFUL OHIO COMPANY.

The Willoughby Telephone Company, of Willoughby, Ohio, which was formerly a branch of the Federal Telephone Company, but is now under separate management, is operating very successfully. It has a capital stock of $10,000 and no bonded indebtedness. The capital stock was purchased of the Federal Telephone Company about a year ago at par and the company has just declared its third 3½ per cent. semi-annual dividend. The company is now earning 14 per cent. on its capital stock and has 160 telephones in operation. It is proposed to increase the number of telephones in operation to 200, when it is figured that the company will earn 20 per cent. on its capital.

When the Federal owned the property it received $12 for residence and $18 for business telephones. The men now in control raised the business rate to $24 and the residence rate to $16. The company receives $24 for party line service outside of Willoughby. The officers are: President, L. W. Penfield; vice-president, W. C. Collister; secretary and treasurer, John H. Smart; general manager, Fred Storm.

NEW PLANT COMPLETED.

The Home Telephone Company, of New Albany, Ind., which operates in conjunction with the Louisville, Ky., Home Telephone Company, has completed its new exchange building in New Albany, and is now installed there ready to give service. It has spent over $100,000 in re-equipping its plant and has constructed practically a new system. The exchange is located in a handsome two-story brick building. The officers' room is located in the front part of the ground floor and in the rear is the terminal room in which is the power-board, motors and ringing generators. The wire chief's desk and protectors are also in this room.

On the second floor are the switchboard and operators' rooms. The switchboard is Stromberg-Carlson, central energy, lamp-signal type, with a capacity of 4,800 lines. About 900 telephones are now installed.

The Home Company is composed of a number of the leading business men and capitalists of New Albany. The board of directors is made up of Charles D. Knoefel, George Borgerding, Charles Day, John A. Armstrong, Charles Dougherty. Mr. Knoefel is president of the company, Mr. Armstrong vice-president, Mr. Day secretary and treasurer. A. L. Têtu is general manager of the company and Frank J. Beaucond is local manager; Harry Matthews is in charge of the contracting department.

The company is constantly increasing its list of patrons, as the service it is giving cannot be excelled. Not only in New Albany is this true, but in Louisville and the numerous country exchanges which are included in the system.

AUTOMOBILES WILL HAVE TO SLOW UP.

A PRESS dispatch from Marshfield, Mass., announces that a plan has been evolved there to enforce drivers of automobiles to run at a proper speed. Special officers are to be appointed in half a dozen sections of the town, each to have a telephone at his command. When a scorching chauffeur is seen that the officer cannot capture, he will telephone on to the next officer to time the machine and hold it up if it is exceeding the legal rate of speed or has violated signals to stop.

STREET RAILWAY TO INSTALL TELEPHONES.

THE International Railway Company, operating a street railway system in Buffalo, N. Y., and vicinity, will install an extensive system of telephones on all its city and interurban street-car lines. There will be about 250 telephones to be distributed along all lines in Buffalo and the lines leading to and beyond Niagara Falls and Lockport, in which two towns, as well as in Buffalo, the railway company will have switchboards of its own.

The general purpose of the adoption of the telephone system is to improve the railway service. It will enable the management to keep in closer touch with the operation of cars, to change schedules without causing delay and to reduce to the minimum those delays which necessarily arise through accidents or mishaps to cars.

The system will comprise four switchboards, one in Buffalo for commercial purposes, and in connection with it a dispatching board, another switchboard at Niagara Falls and a fourth at Lockport. These boards will be connected by several lines, telephones being placed at the nearest sidings, crossings and cut-outs. A part of the system will extend into Canada, wires being carried across at the upper arch bridge at Niagara Falls.

In connection with the telephones an electric light signal system will be installed which makes it possible for the dispatcher to attract the attention of motormen at terminals and at junctions of important lines by causing a group of electric lamps to glow. When that signal is shown a motorman must call the dispatcher for orders.

CONSERVATIVE MANAGEMENT PAYS.

FROM the time it commenced operation the first day of October, 1898, the Valley Telephone Company, of Saginaw, Mich., has regularly paid a quarterly dividend of 2 per cent., or 8 per cent. yearly. One of the most convincing evidences of the prosperity of this company is to be found in the fact that during the past three months, between $35,000 and $40,000 worth of stock in the company has been sold at par. The major portion of this stock was subscribed by the present stockholders, they being given the first option. The company's stock is recognized as one of the safest and best paying investments in the State of Michigan and had it desired, three times as much stock could have been sold to outside parties.

This money will be used for new construction and in extending the system of the company during the coming season.

The Valley Company has been very conservative, and has sometimes been criticized by managers of other Independent properties for this, but the results obtained, fully justify the company's policy. The directors believe that new money should be secured for extensions instead of using up the profits. They also believe that a successful telephone property depends not on the number of subscribers, but mainly on the quality of service given, reasonable rates, and at the same time leaving a good margin of profit. These things secured, subscribers will come without much effort.

The company operates exchanges in Saginaw, Bay City, and Flint, Mich., and has about 4,000 telephones connected. It owns 210 miles of toll lines, with 280 miles of No. 10 copper metallic circuits. Its numerous traffic agreements, sub-exchanges and long distance connections give it service over practically the entire State of Michigan and most of the surrounding States. The officers of the company are: James E. Davidson, president; John L. Jackson, vice-president; R. F. Johnson, secretary, and Orrin Bump, treasurer.

FRONTIER WINS A VICTORY.

THE Frontier Telephone Company, the new Independent company which has been operating in Buffalo, N. Y., only a short length of time, has scored a signal victory already over its rival, the Bell Telephone Company. The Finance Committee of the Board of County Supervisors has voted to accept the proposition of the Frontier Company for furnishing telephones to all the county offices. This means that the use of Bell telephones will be discontinued at the conclusion of the present contract, which expires July 1 of this year. The offer of the Frontier Company was to install as many instruments as the Bell now furnishes to the county officials for a total of $952, with an additional charge of $32 for the Sheriff's office and the county almshouse, providing that two lines are required to connect the Sheriff's office with the jail and the almshouse with the county hospital. It makes additional small charges for incidentals like extension bells, buzzers, etc., and an additional charge of $12 each a year for extension telephone instruments.

The contract which the county now has with the Bell Company calls for the payment of fully $2,000 for the same number of telephones as are offered by the Frontier, and has an extra charge for all messages over 50,000.

EXPERT TO REPORT ON MICHIGAN BELL.

WILLIAM A. JACKSON, formerly general manager of the Michigan Bell Telephone Company and one of the most expert telephone men in the United States, has been employed by the Union Trust Company, receiver for the Michigan Telephone Company, and the bondholders' protective committee, to make a thorough examination of all the telephone properties in Detroit, Mich., that have passed into the receiver's hands to determine their exact value.

CUYAHOGA WILL RAISE RATES.

PRESIDENT DICKSON, of the Cuyahoga Telephone Company, of Cleveland, Ohio, will ask the new city administration immediately after it comes into power for permission to increase its rates, says *Finance*, of Cleveland. President Dickson has received advices from the best legal talent in Cleveland that the company has the right to increase its rates whether the city consents or not, but in order to show a friendliness towards the new administration he will ask for permission. If this permission is not granted, however, the rates will be increased without it.

It is proposed to put in a party line service differing from the Bell in this respect, that the operator at the central station can call one subscriber without ringing another subscriber on the same line, and the line is also private in that subscribers on the same line cannot hear each other's conversation. The new rates will be as follows: Four-party line service, $24 a year; two-party line service, $36 a year; full metallic residence service, $48 a year; full metallic business service, $60 or $72 a year. It is figured that if these rates are charged the company can immediately be put on a paying basis.

The debts of the company to the Federal will be provided for by an issue of 6 per cent. cumulative preferred stock, of which $1,000,000 will be sold at $60, realizing $600,000, of which at least $450,000 will be taken by the Federal Telephone Company in lieu of the Cuyahoga's debt to the Federal, and the remainder $150,000 will be issued for the installation of the party line service heretofore referred to and other improvements.

The Editor's Page.

SOME LESSONS FROM GERMANY.

OUR readers will find the description of the German telephone system published in this issue of great interest. The backwardness of telephone development in the Kaiser's realm, gives rather a setback to the pet theory so often advanced by Bell advocates, that telephony can thrive as it should only where the service is a monopoly. The German Government has absolute control of the system; its rates are low and its field large. Yet, with all these advantages, the art in the empire is fully ten years behind the times as we understand them here. The common battery system, found to-day even in fourth-class towns with us, is an unknown institution with the Germans. The reason for this lagging is simple enough. Without the stimulus of competition, progress has limped. The accepted is considered good enough where there is no rival in the field to offer better. It is a fine illustration of what would be the state of affairs with us to-day but for the advent of the Independents with their pushing methods and modern business ideas. Had the Bell remained in control of the field, American telephony would be where German telephony is. The people here are beginning to wake up to this fact, and the realization is not helping the old company. Public sentiment is a very powerful factor, and the Bell people are gradually awakening to this fact. Unfortunately for them, the wakening is a bit late, but they are endeavoring to make the best of a bad situation by influencing or attempting to influence in various and queer ways the popular mind against the Independents.

Some time ago we published a contract made by the Bell with a majority of the newspapers in New England. This contract gave the newspapers special rates for local and long-distance service in return for an implied agreement under which the papers bound themselves to use their columns against the Independent cause. The result was that the New England people were generally kept in ignorance of the true state of affairs in telephone competition. Latterly, however, the enterprising Independent operators in Maine, Massachusetts and elsewhere have been able to overcome much of this influence, and progress has been proportionately advanced.

Outside of New England the press has generally lined up against the Bell and no such control could be exercised. This has driven the old companies to the advertising columns, where they have done some rather clever work, the efficiency of which, however, is in doubt. A typical example came to public notice recently in the town of Ithaca, N. Y., where the Independents have just completed a fine plant. After trying in vain to influence the Ithaca editors, the Bell company finally resorted to running long "reading notices," in which the old stock arguments against competition were rehearsed at length. Unfortunately, the Ithaca newspapers insisted on putting the fatal trademark, "advt," at the end of these long and costly articles, and the Bell company had finally to quit in disgust.

ANOTHER IMPORTANT CASE.

THE appeal in the suit brought by the Bell Telephone Company on the Carty Bridging Bell patent No. 449,106, was heard in Philadelphia on March 30th and 31st. This case was decided in the Circuit Court of the United States for the Eastern District of Philadelphia in favor of the defendants, the court in rendering its opinion, declaring that the Carty patent did not describe a patentable invention, and that it was, therefore, invalid and of no force or effect.

From this decision of the lower court, the Bell company appealed to the Circuit Court of Appeals at Philadelphia. The case was argued orally before the Court of Appeals by Charles C. Bulkley, representing the defendants and Edward Rector for the Bell.

If this patent for the bridging bell is defeated, following closely upon the heels of the defeat of the Berliner patent, it will sweep the field clean of all foundation or broad patents owned by the Bell. It is to be hoped the court will find it possible to arrive at an early determination of the case, and in favor of the defendants.

THE IMPATIENT TELEPHONE PUBLIC.

THE telephone manager is in business to do business at a profit, to attract and keep customers and to give them a fair return for their money. He has before him, as we have said before, two great problems—his rates and his service. Each of these problems encloses innumerable minor and subsidiary problems, and to say that rates and service are the two most important points in the telephone business is, after all, merely to crystallize all the various questions with which a telephone manager has to deal into the two chief heads of the business. However, it will be obvious that from whichever point of view the subject be regarded, whether from the outside or from the inside, these two are the most important of all the various aspects of the telephone business. Indeed, from the point of view of the public, of the customer, they are the only real points of interest. If the customer receives from the telephone company a good service at a rate that he considers a fair figure, that is all he really cares to know about the telephone company. How they do it does not concern him in the least; and, as long as he is satisfied with the service and with the price he pays for it, the internal management of the telephone company interests him not at all.

It is only when things go wrong, when the rates are considered too high and the service bad, that the customers and the general public become interested in the affairs of the telephone company and begin to make unkind remarks and ask impertinent questions.

The use of the telephone is apt to beget a certain amount of nervousness and impatience in the individual of ordinary disposition, and greatly increases the intolerance and aggressiveness of those who are naturally given to being intolerant and aggressive, so that it falls out that telephone subscribers as a body are not the easiest people in the world to deal with. As a general thing it may safely be asserted that telephone users make their complaints against the telephone company, when they have any to make, with far more force and acerbity than they would usually employ in complaining of irregularities in other public services, such as the postal, telegraphic, street or steam railway services. The man who will explode with wrath at some trifling delay or difficulty with the telephone and, perhaps, write a bitter letter of complaint—not always free from exaggeration—regarding a hitch of very trifling importance will see his morning and evening train ten or fifteen minutes late without giving the matter a passing thought.

The long-suffering public will put up with such delays and hardly utter a plaint, beyond an occasional piteous wail in the newspapers. But he takes it out of the telephone company. Here he is acting as an individual, and stands on his rights as such. He makes his own time table and insists on it being stuck to, or he will know the reason why. How many railway passengers ever make individual complaints directly to the railway companies of the unpunctuality of trains, although their trains are habitually late, morning and evening? Yet, let a telephone call be delayed a few minutes and the irate subscriber is at the exchange manager in a moment or indites a letter to the general manager; and it is right that he should. The standard of efficiency of a telephone service should be a high one, because, unless the telephone service is prompt and effective, it is for a large proportion of calls worse than useless. On a late train you do get there, even if you take a little longer on the journey; but with a delayed or ineffective telephone call you generally get nowhere. That the public should take telephone inefficiency to heart more keenly than they do inefficiency in other public services is perfectly understandable when the peculiar nature of the telephone service is considered. And this aspect of the telephone service is one that the telephone manager should always keep in mind.

If he keeps a close watch on his subscribers, cultivating his own and his operators' patience, even when the telephone user's objections are particularly exasperating, he will find his reward in a steadily growing list. It is the recognition of these outside conditions, too often ignored by the Bell people, that gives the wide-awake Independent a distinct advantage.

ELECTRICAL MEASUREMENTS — ARTICLE XI — THE WATTMETER

By Arthur Vaughan Abbott.

ANOTHER form of electrical meter, which is of vital interest to the modern telephonist who buys electrical energy, for the storage batteries which operate his exchange, is the Wattmeter. It has been shown that the amount of electricity which traverses any circuit is proportional to the pressure or electromotive force which moves the current. Therefore, in either selling or buying electricity both factors, the pressure and the current, must be recognized.

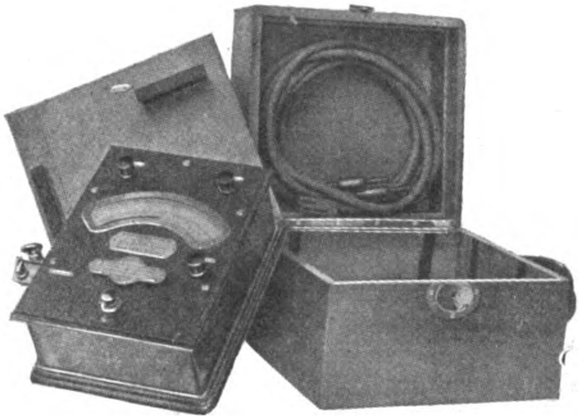


FIG. 1—INDICATING WATTMETER.

In estimating energy from other sources, such as steam engines, water wheels or the like, we are accustomed to use the horse-power as the unit of measure. The horse-power was invented by James Watt in the early days of the steam engine. At that time mining machinery of all kinds was operated by horses and when Watt proposed to substitute a steam engine, it was natural for him to reckon the ability of the engine as so many horse powers, on the supposition that it would be possible for the engine to displace a corresponding number of horses. Soon it became necessary to define the horse-power itself, and Watt considered it to be equivalent to 33,000 foot pounds per minute, that is to say equal to the power required to lift one pound 33,000 feet high in one minute, or 33,000 pounds one foot high. Here the notion of a composite unit is clearly presented, for we are faced with the idea of raising a certain weight through a given space in a definite time, and when we speak of an engine as being of 50 or 100 H.P., we mean that in a minute of time it is capable of exerting a power equal to 50 or 100 times 33,000 pounds raised one foot high.

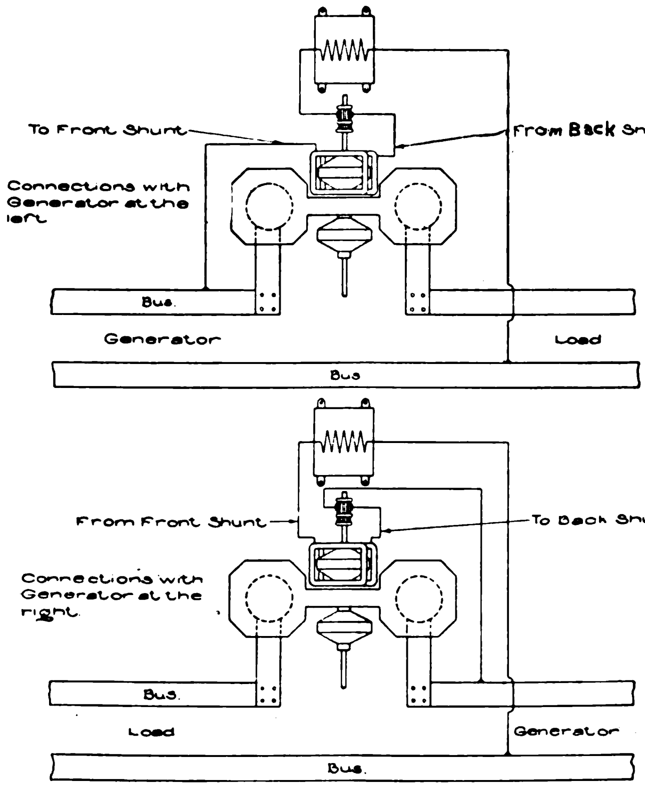


FIG. 3—CIRCUIT OF WATTMETER.

The electrical unit of power is named the ***Watt*** after the famous steam engineer and the "Watt" is defined as the amount of power developed when one ampere is delivered at a pressure of one volt, and frequently Watts are termed ***Volt-Amperes,*** a cognomen which is evidently quite similar to the foot pound. Consider an ordinary incandescent lamp, placed upon Edison mains, at a potential of 110 volts, the usual size is rated at 16 C. P. and consumes about .5 of an ampere. The Watts taken by the lamp therefore are $110 \times .5 = 55$. Such a lamp is commonly spoken of as a 50 Watt lamp. Another properly designed lamp placed upon a 220 volt circuit, if of the same candle power, would take about ¼ of an ampere, and under these circumstances the Watts consumed would be 220×25 or 55, the same result as before.

The necessity in buying and selling electrical energy, of recognizing both the pressure of the circuit and the amount of current delivered, is very evident, for if the pressure decreases the amount of current supplied will correspondingly diminish, and if the pressure increases more current will be forced through the same resistance. Therefore, any form of measuring instrument to ascertain the *power* delivered by any circuit must estimate both the voltage and the ampereage. Instruments for this purpose are, from the name in the electrical unit of power, termed Wattmeters.

There are two forms of the Wattmeter, one, the general appearance of which closely resembles the voltmeter, is shown in Fig. 1. This instrument is termed ***Indicating Wattmeter.*** It has a needle which moves over a graduated scale, and if attached to any circuit indicates the instantaneous amount of power which the circuit is carrying, so if one wishes to know the quantity of power which is delivered in any given time, such as a minute or an hour, it is necessary to make a number of successive readings and take the average, for usually the quantity of power varies from time to time and a single reading of an Indicating Wattmeter would be insufficient to show the true amount.

In treating the D'Arsonval galvonometer it was shown that a wire carrying an electric current placed between the poles of a magnet would be repelled by the magnet. Two coils, each of which carry a current, behave exactly in the same manner as one coil and a magnet, that is they repel each other. If, therefore, two coils of wire be arranged, one inside of the other and a current sent through both coils, there will be mutual repulsion; and if one coil is fixed and the other is suspended parallel thereto in a manner easily to be moved, the movable coil will swing and endeavor to place itself at right angles to the fixed coil. This is the principle employed in the construction of the Indicating Wattmeter. The instrument is supplied with one coil made of very large and heavy wire, capable of easily carrying all the current in the most powerful circuit to which the instrument is likely to be attached. Inside of this heavy coil is placed a light coil wound of very fine wire, possessing great resistance, precisely similar to the fine wire coil of the voltmeter. This fine wire coil it attached across the circuit, the power of which it is desired to measure, while the coarse wire coil is placed in series with the circuit. It is easy to see then that in the Wattmeter we have two instruments, an ammeter coil (the large wire) and a voltmeter coil (the small wire). It is evident that the mutual reaction of the two coils will be in proportion to the *quantity* of current flowing in the large one, and the *pressure* in the small coil, just in the same manner that the readings of the ammeter are proportional to the quantity of *current* in the circuit, *into* which it is inserted, while the readings of the voltmeter are proportional to the *pressure* of the circuit *across* which it is placed. If the current in the circuit to be measured is so small as to be inappreciable, there will be no current in the coarse wire coil, and no matter what the pressure of the circuit may be, there will be no relative movement between the coarse and fine wire coils. Conversely, no matter how large a current might be traversing any circuit in which the Wattmeter was placed and flowing through the coarse wire coil, if the pressure of the circuit is infinitesimal there will be no current in the fine wire, and consequently no mutual reaction between the coils. Thus it appears that the Indicating Wattmeter is a kind of electric multiplying machine, for its pointer indicates the product of the volts and the amperes in any circuit in which it is placed.

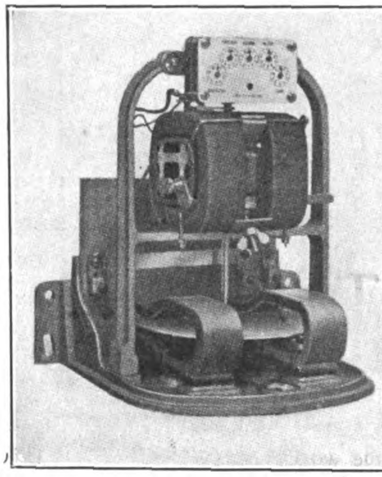


FIG. 2—INTEGRATING WATTMETER.

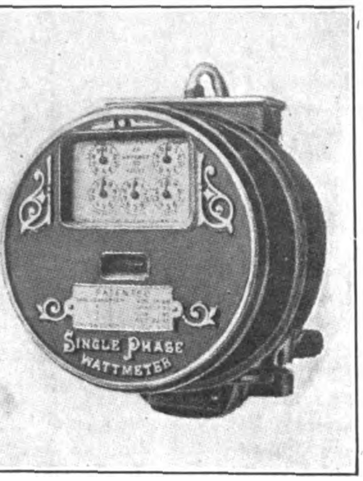


FIG. 4—READY TO MOUNT.

The operation of using the Indicating Wattmeter is as simple and very nearly identical with the use of the voltmeter or ammeter. From Fig. 1 it is seen that there are four binding posts upon the instrument. The two heavy screws on the left hand side are placed in series with the circuit to be measured, while from the two small posts on the top of the case a pair of fine wires is taken across the circuit and as soon as the instrument is connected the needle at once indicates the number of Watts which the circuit is at that time delivering.

While the Indicating Wattmeter is an exceedingly desirable instrument for many purposes of measurement, it is less interesting to the telephonist than the *Integrating Wattmeter,* which measures the total amount of electrical energy which is delivered by any circuit between any two successive readings of the instrument. It is to the last degree advantageous to any telephone exchange buying current from a central station to keep its own Wattmeter and make frequent readings of the amount of energy consumed. One of the best known forms of the Integrating Wattmeter is shown in Fig. 2. The machine is really a little electric motor, supplied with a dial that registers the number of times that its shaft turns around. The instrument consists of a heavy base plate, supporting a brass frame, that carries a pair of coils wound with heavy wire, exactly similar to the series coils in the Indicating Wattmeter, and likewise these coils are placed in series with the circuit whose delivery of power is to be measured. Between these coils extends a light steel shaft that is supported in jewel bearings, the lower one upon the base plate, and the upper one upon the brass frame. Inside of the coarse wire coils is a fine wire coil that is secured to the shaft. This fine wire coil corresponds exactly to the fine wire coil of the Indicating Wattmeter and performs exactly the same function, for if the coarse wire coils be connected in series with any circuit and the fine wire coils be connected across the mains, the inevitable repulsion between the coils will take place. As the shaft is free to move it will turn around, exactly in the same manner as a street car motor propels its car. Upon the base plate two magnets are located and upon the shaft a copper disc is fastened in such a manner as to rotate between the poles of the magnet. These magnets exercise a drag upon the copper plate, which opposes rotation. It has been found possible to so design this instrument that the speed at which the shaft turns is proportional to the power delivered by the circuit upon which it is placed. On the top of the brass frame a set of dials is secured, geared to the shaft, which indicate the number of revolutions made in any given time. If, for example, it be found for a circuit delivering 10 Watts that the shaft turns ten times, and if the dial shows the reading of 10 in one minute after the meter has been connected, it is said that the circuit has delivered 10 Watt minutes. One will immediately recognize the similarity of this unit to the 33,000 foot pounds per minute, which constitutes a horse-power. As a matter of fact, experiment shows that 746 Watts are equal to 33,000 foot pounds, and if a circuit delivers 746 Watts in one minute it is giving the same amount of power as 33,000 foot pounds per minute, or in other words, one horsepower per minute.

Fig. 3 shows the circuits of the Wattmeter, illustrated in Fig. 2, while Fig. 4 indicates the appearance of the Wattmeter enclosed in its case, ready for mounting upon the switchboard. Both of the instruments described are equally divisible on the direct or alternating currents.

The telephone exchange manager will find it extremely instructive to keep a careful watch, day by day, of the amount of current which is supplied to a common battery exchange, by taking the readings of the Wattmeter once every hour. By arranging the Wattmeter so that it may be placed in the discharge side of the battery, then by taking readings every hour during the leisure part of the day and every 10 or 15 minutes during the busy hours, an extremely valuable record of business transacted by the exchange is easily obtainable. Many exchanges go so far as to provide a separate Wattmeter for the charge and discharge circuits, and readings are made at frequent intervals. This is one of the easiest methods whereby a manager can check the business his exchange is transacting, for with a common battery board the output of the storage battery is exactly proportional to the number of calls. By counting the number of connections which are made in any given time, and reading the amount of energy supplied by the Wattmeter the number of Watt hours per call is easily determined. As a general average it is found that each call consumes 2½ Watt hours; hence knowing this constant, it is easy from day to day to keep a record of the business and to ascertain the number of calls made by subscribers.

INVITATIONS TO DEDICATION CEREMONIES.

INVITATIONS to the dedication ceremonies of the Louisiana Purchase Exposition, which commemorates the one hundredth anniversary of the acquisition of the Louisiana Purchase, are being sent out. The exposition will be formally thrown open to the public at St. Louis on April 30, 1903, and the dedication ceremonies will occur on this date and on the 1st and 2nd of May.

The invitations are perfect from the standpoint of the typographer and bookmaker. They are bound in a rich tissue vellum. On the first page is a representation of an Indian in a canoe on the Mississippi and a knight in armor on horseback, the horse wading in the river. These are embossed in two colors. The next page contains the formal invitation handsomely engraved in script, with fac simile signatures of David R. Francis, president of the Exposition, and Thomas H. Carter, president of the Government commission. On the back cover is an etching of a Venetian scene with gondolas plying in the water and a representation of one of the exposition buildings in the background.

The Telephone in the Courts

CONDUCTED BY A. H. MCMILLAN.

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

CUTTING TELEPHONE WIRES.

THE Southwestern Telegraph & Telephone Company, operating in Texas, is fighting an attempt to collect from it by suit a reward of $1,000 offered for the arrest and conviction of any person guilty of cutting, tearing down or misplacing its telephone wires, posts and machinery, or interfering with the transmission of messages along its wires in violation of Article 784 of the Penal Code. After the reward was offered one, Taylor, was arrested and convicted of the offense. Three persons came forward to claim the reward. John Priest, a watchman in the service of the company, being denied it, brought suit. Thomas Hennessy intervened, made himself a party to the suit and claimed the reward himself. Thomas Williams, the constable who made the arrest, also claimed the reward, and was made a party to the suit on motion of the defendant. He died pending the action and his heirs were made parties. The defendant answered as to Priest, that when employed as watchman, he was informed that the wires, which were being cut, and which he was expected to watch, were "dead wires," not in use, and that the reward offered by the company did not apply to them. As to Hennessy, it is alleged he did not share in either the arrest or conviction of Taylor, and as to Williams, that in making the arrest he was acting in the simple performance of his duties as an officer and not entitled to the reward.

The plaintiffs obtained a judgment in the county court, but the judgment was reversed by the court of civil appeals. In giving its decision, the court held that the fact that the wire cut was a dead one and did not come within the offer and that Priest, the watchman, had personal notice that the reward did not apply to such wire was a good defense against his claim. It held, too, that if the constable made the arrest in discharge of his duties as an officer, he was not entitled to any part of the reward. Other facts not set forth in the opinion were held a complete defense against the claim of Hennessy, the third claimant. The case was ordered tried again.—*Southwestern Telegraph & Telephone Co. v. Priest, 72. S. W.* 241.

MORTGAGE COVERED AFTER-ACQUIRED POLES AND WIRES.

THE Court of Chancery of New Jersey applied the well known rule that a mortgage may cover after-acquired property to a suit of interest to telephone companies when it rendered its recent decision in the case of the Monmouth County Electric Company *v* Central Railroad Company, of New Jersey, *et al.* A corporation, one of the defendants, gave a mortgage covering all its existing and after-acquired property. After the mortgage was executed and duly recorded, it erected poles and wires upon the railroad company's property under an agreement with the latter. The mortgage was foreclosed and the property covered, including the poles and wires upon the railroad company's land, was sold at sheriff's sale to the complainant, the Electric Company, for $250,000. The railroad company claimed a lien upon the poles and wires standing upon its land and disputed the Electric Company's right to them. The latter company, to maintain its claim, filed a bill of complaint asking that the railroad company be required to redeem from the sale or that their asserted interest in the poles and wires be foreclosed.

In granting the petition of the complainant, the court held that the Electric Company, as purchaser at the foreclosure sale, was subrogated to the rights of the mortgagee in the foreclosure suit. It construed the agreement between the mortgagor and the defendant as keeping the poles and wires the property of the mortgagor company, although placed upon defendant's land, and decided that they remained the property of mortgagor at the time of the foreclosure. The mortgage, expressly including after-acquired property, was in equity a lien upon the poles and wires prior to that of the defendant company, which had only the right to purchase at a valuation or to require their removal at the termination of the agreement by which they were placed upon defendant's land.—*Monmouth County Electric Co. v. Central Railroad Co., of New Jersey,* 54 *A.* 140.

INJURY TO LINEMAN—DUTY OF COMPANY TO INSPECT POLES.

THE Supreme Court of New York affirmed the order of the Kings County Court denying a new trial in the personal injury case of Walsh v. New York & Queens County Railway Company. The company was removing its cables and wires, used in operating its electric street railway, from wooden poles on one side of Jackson avenue, Long Island City, to new iron poles on the other side. Walsh, one of the linemen employed in the work, preparatory to taking down the cables, ascended one of the wooden poles and began to saw the wire. After cutting through the wire the pole fell, carrying him with it and injuring his back and neck. The pole was deteriorated by dry rot, though this was not obvious from ordinary inspection because of the painting. Other poles in the vicinity were so solid they had to be chopped down.

In its opinion the court said that the real question was whether the defendant had provided a reasonably safe place for plaintiff to work in; and whether the plaintiff had been reasonably careful under the circumstances. He was not bound to exercise the highest possible degree of care; he was not bound to fasten the pole with guy ropes, braces, etc. The duty of inspecting the pole belonged to the company, his master, and there was no evidence that it had made any proper inspection of the pole.

Judge Goodrich dissented from the opinion of the rest of the court. He thought the accident resulted from plaintiff's neglect to brace the pole and from his fellow workmen's failure to examine it.—*Walsh v. New York & Q. C. Ry. Co.,* 80 *N. Y. Supp.* 767.

MINIATURE TELEPHONE LINE IN COURT.

THE jury in the case of Pflantz *v.* the Iowa Telephone Company, on trial in Des Moines, Iowa, disagreed. Raymond Pflantz, a boy ten years old, lost his left arm by taking hold of a live wire hanging from a telephone pole and his father sued in his behalf. The defense was that the wire was not the defendant's property, but belonged to either the Des Moines Edison Electric Light Company or the Mutual Telephone Company. One of the features of the case was the introduction in court of a miniature telephone line with wires of thread, poles of chair rounds and spools for insulators.

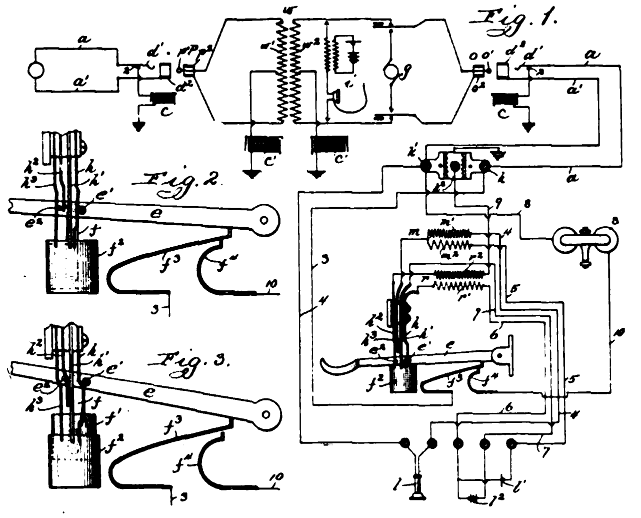
EXCLUSIVE CONTRACTS UNREASONABLE.

CONTRACTS which prohibit subscribers from using but a certain telephone service for one year, have been held unreasonable by the lower court in the case of C. M. Mitchell and R. E. Everett *v.* the Home Telephone Company, of Springfield, Mo. One of the relators signed an exclusive contract, but afterwards decided that he did not want to give up the Bell telephone he was using. The other did not sign an exclusive contract, but decided that he wanted both telephones. The court awarded a pre-emptory writ of mandamus compelling the company to furnish the complainants with telephones, regardless of whether they used any other telephone or not.

Patents

IMPROVEMENT IN SIGNALING APPARATUS.

Francis W. Dunbar and Wm. W. Dean, of Chicago, Ill., patent (No. 724,451), and assign to the Kellogg Switchboard & Supply Co., a signaling apparatus. This is an improvement in sub-station signaling apparatus by obviating the necessity of the magneto generator. It is illustrated diagrammatically in Fig. 1. At the sub-station the inventors provide a large and powerful induction coil, and the switchhook is arranged with a long sliding contact, so that when the receiver is removed the induction coil will be connected with the local battery for so long a period of time as to become thoroughly magnetized. In addition the switchhook is supplied with a dash pot so its motion is retarded.



Finally, when the switch-hook has risen to its proper place, the induction coil is discharged and the kick produced thereby is sufficient to throw a drop, or operate any other form of signal at the central office.

TELEPHONE SIGNAL.

Benjamin O. Fox, of Milwaukee, Wis., patents (No. 724,093), a combined telephone, signal, burglar and fire alarm. The device is shown in Fig. 4, in which *A* is the central office and *B* is the subscriber's station. The inventor makes use of the ordinary metallic line for telephoning and of both sides of the line and ground to operate the burglar and fire alarm.

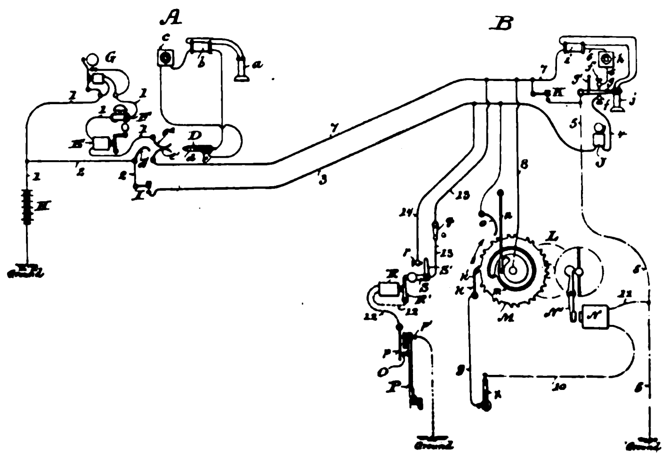


FIG. 4.

Telephonic transmission is accomplished in the usual manner—in addition, the inventor introduces a thermostat and automatic motor-actuated fire alarm box *L* in the grounded circuit.

The burglar alarm is shown at *O* and consists of a pin *P* which may be attached in any window or door, so arranged as to close the circuit when disturbed.

TELEPHONE CIRCUIT.

John H. Mason, of Philadelphia, Pa., patents (No. 724,594), and assigns to the Wheatstone Bridge Telephone Company, of Souderton, Pa., a telephone system. By this patent the inventor claims to be able to serve any number of stations with a wire plant system that provides only one more wire than there are stations, but at the same time every station has the advantage of a complete metallic circuit.

The device is shown in Fig. 5, from which it appears that there are two main conductors 1 and 2 from a central battery across which all the stations are connected. In addition there is an individual wire from each station. In Fig. 5 these individual wires connect the stations in pairs, but it is easy to see that every station may be provided with a switch, whereby it can be connected with any other station. The general design of this circuit is that of the Wheatstone Bridge and when any pair of stations are talking they occupy the opposite arms of the bridge and thus the inventor claims to secure a perfect balance.

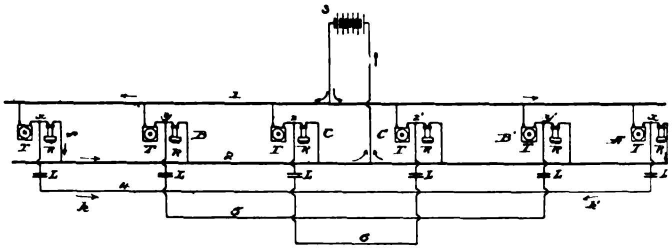


FIG. 5.

SWITCH HOOK FOR DESK TELEPHONES.

Charles Holmok, of Cleveland, O., patents (No. 724,478), and assigns one-half to Walter Kroelling, a switch mechanism for telephone transmitters.

This invention is illustrated in Fig. 6. The switchhook itself is supported upon an insulated plate *2*, and is provided with two springs *9* and *10*. These springs pass through posts *11* and bear upon the contacts *12*. It is evident that by this means the springs can be given great flexibility and a rubbing contact secured.

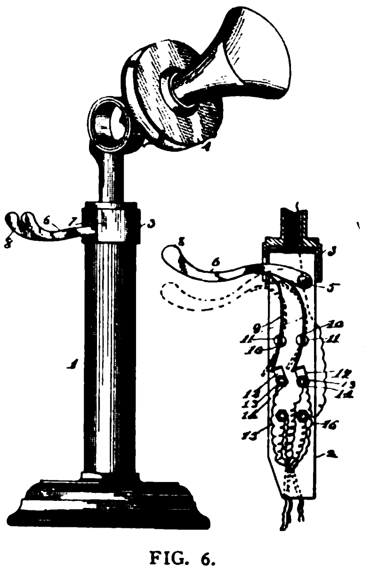


FIG. 6.

IMPROVEMENT IN ELECTRIC GENERATORS.

E. A. Terpening, of Geneseo, Ill., patents (No. 724,144), an attachment for electric generators. The object of this patent is to provide a commutator attachment for the ringer generators used in telephony, whereby an alternating current generator may be arranged to give a pulsating current of either polarity in addition to the alternating current.

The device is shown in Figs. 7 and 8, from which it will be seen that the inventor provides a peculiarly arranged commutator which may be attached to any existing generator, consisting of a shaft *33*, clamped along the side of the magnets carrying an insulated piece of rubber *40*, upon which springs *26* bear. The shaft *33* forms a commutator whereby a pulsating current of either polarity is produced and transmitted to the respective springs.

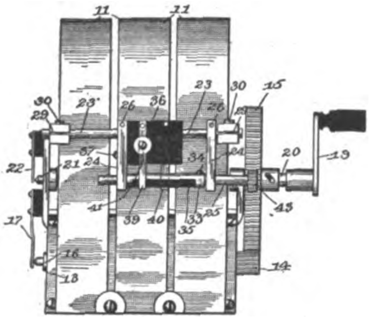


FIG. 7.

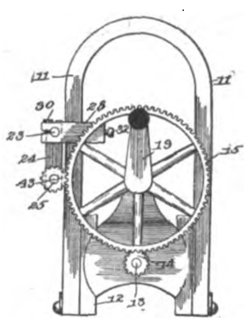


FIG. 8.

CONDUIT FOR ELECTRICAL CONDUCTORS.

Robert W. Lyle, of Perth Amboy, N. J., patents (No. 723,892), a tile or conduit for electric conductors. This is an improvement in the construction of duct material for underground conduits. It is shown in Figs. 9, 10 and 11. The inventor cuts one or more mortices in the end of each piece of duct material; these mortices being so shaped as to contain the largest possible tenon without interference with the cable spaces. when the tile is laid. Tenon *6* in Fig. 10 is inserted in the mortices *5*, Fig. 9, as shown in Fig. 11, and by this means very exact centering is claimed.

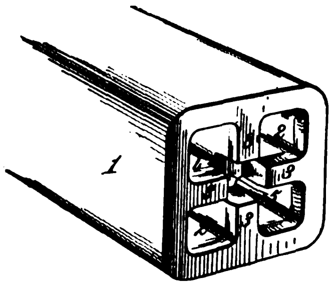


FIG. 9.

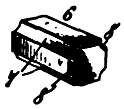


FIG. 10.

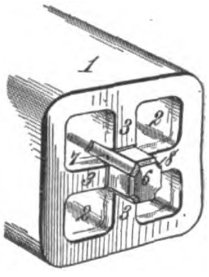
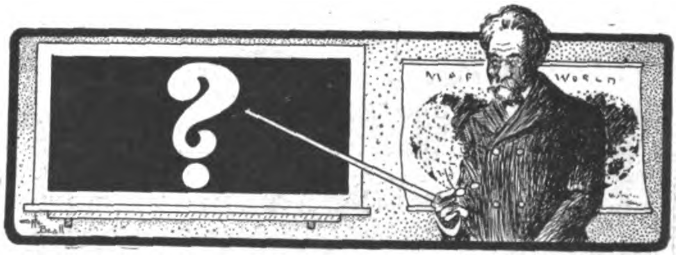


FIG. 11.

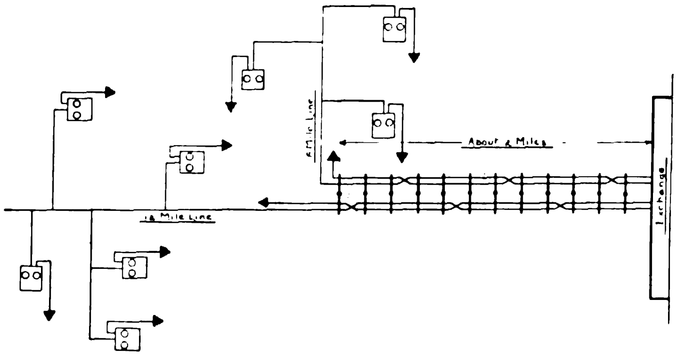


CROSS TALK PROBLEM.

If I run two grounded telephone lines on the same poles, can I overcome cross-talk by making them full metallic as far as it is required to run on the same poles? (See diagram.) At the point where the grounded lines branch off I ground the metallic lines instead of grounding them at the exchange.

W. K.

It is impossible from your diagram alone to determine whether the cross-talk you describe is due to mutual induction between the circuits on the poles, or whether it is not due to, proportionately, the telephonic currents on one line, returning through the ground on the other line. If the former is the difficulty, putting on a ground that is suggested *might* remedy the trouble, though it is improbable. The only way to operate such lines, as are shown in the sketch, entirely successfully, is to make them completely metallic.



TRANSPOSE EVERY 1,300 FEET.

What is the proper distance to transpose a twenty-five mile metallic circuit?

Under ordinary conditions an aerial line should be transposed as often as every 1,300 feet, irrespective of its length. If the line is very short and under special cases, where it is particularly exposed to inductive disturbances, it may be necessary to transpose at every pole, or even to substitute a twisted pair for the open wire.

A HUSTLING BUSINESS POLICY

AN example that every Independent telephone company in the United States could well afford to follow, is furnished by the progressive and hustling methods of the Northeastern Telephone Company, which is now constructing a system in Portland, Me. This territory is the real stronghold of the Bell Telephone Company, and practically the only part of the United States where the Independent companies have not a firm foothold. The Northeastern Company has had a long, hard struggle to secure recognition at all—the press and the public at first uniting almost unanimously with the Bell interest, with which they were closely allied, in smothering competition. There has come, however, a gradual change of sentiment. From working with the Bell and against the Independent company, the press and the public gradually reached neutral ground, and finally passing this stage, are rapidly becoming enthusiastically favorable to the Northeastern Telephone Company.

Probably the man who deserves the greatest credit for this change of attitude is Lewis A. Goudy. He is a hustler among hustlers and his methods are certainly to be admired and emulated. He has worked indefatigably in every manner possible, in advertising, in appearing at public meetings and answering questions and explaining the advantages to be attained by Independent competition and in interesting capital in the undertaking.

In the publicity line, one example will show what he is doing. The Portland *Evening Express* on March 21 contained five columns devoted to a general descriptive article on the system the Northeastern Company is preparing to install in Portland. It showed the building, described it, gave a view of the exchange system to be employed, showed cuts of the instruments and described fully the vast undertaking of installing the conduit system, aerial system, etc. In the same paper of the issue of March 17 an advertisement appeared showing the advantages of single line service over the party lines, so common in Portland and other Bell systems in the larger cities, illustrated by cuts. It is significant that directly below this advertisement the Bell Company had a three-inch double-column advertisement announcing a reduction in its rates, which undoubtedly is to be attributed to the activity of the Northeastern Company.

These are only examples of the policy of the Northeastern Company in advertising its plans and keeping before the public. Every day in the news and advertising columns of the Portland papers there is something pertaining to the company. To this, more than anything else, is to be attributed the now favorable attitude of the general public, and its confidence and belief in the desirability of competition.

The Week's Messages.

FINANCIAL.

ATLANTA, GA.—The first return on the franchise of the public utility concern has been made by the Glade Carlton Telephone Company, with headquarters at Point Peter, Ga. The value of the franchise is fixed at $204.63. The value of the physical property is stated at $775.57, and the stock at par returned at $980. Subtracting the value of the physical property from that of the stock the value of the franchise is ascertained.

MOLINE, ILL.—An official of the Union Electric Telephone and Telegraph Company says that the plant installed last year in the tri-cities has cost fully $125,000 more than the estimate. To meet this extra expense a meeting of the stockholders is soon to be held to increase the capital stock of the concern. The company has connected its Davenport exchange with a country line reaching from Davenport to Tipton, Iowa. No steps have yet been taken to extend the lines from Moline eastward and as yet no connection has been made with the Crescent Telephone Company.

DES MOINES, IA.—The finance committee of the board of directors of the Mutual Telephone Company has submitted a plan for the reorganization and financing of the company, the rebuilding of the property and readjustment of its relations to the city. It is the purpose of the Mutual directors to issue additional common stock instead of issuing preferred stock and bonds, in large amounts. The directors propose to maintain the mutual feature of the company. It is possible that the present preferred stock will be retired. There is $30,000 of it. The present common stock amounts to $24,000. The improvements contemplated will cost from $75,000 to $100,000 without the building, which would cost $50,000 additional. If the building is not built an additional stock issue of $150,000 would make possible the improvements, would retire the preferred stock and would take up the bonds now outstanding. The bonds amount to $20,000.

MT. AYR, IA.—The Mt. Ayr Mutual Telephone Company has voted to increase its capital stock to $2,000 to install a new switchboard and make other improvements. J. H. Allyn is president and C. L. Lunney, secretary.

PORTLAND, ME.—The Northeastern Telephone Company has filed with Mayor Boothby two $10,000 bonds issued by the Fidelity Company, E. C. Jones, agent. One was to secure the city during the progress of laying underground conduits and the other is a permanent bond that guarantees that all the contracts and agreements made with the city shall be fulfilled.

HOWELL, MICH.—The Livingston County Mutual Telephone Company has increased its capital stock from $10,000 to $50,000.

ST. PAUL, MINN.—The Consolidated Telephone and Telegraph Company, the long-distance branch of the Twin City Telephone Company, has filed a report with the State Auditor showing gross earnings for the year ending Nov. 30, 1902, amounting to $2,156.60. This amount covers a period of only nine months, as the lines were not opened for business until February of 1902, and the earnings for the year on the same basis would be $2,875.

BUFFALO, N. Y.—The State Board of Assessors has fixed the value of telephone franchises here as follows: Frontier Telephone Company, $175,000; Bell Telephone Company, $600,000; American Telephone and Telegraph Company, $20,000.

GRANVILLE, N. Y.—The Granville Telephone Company has certified to the Secretary of State that it has increased its capital stock from $30,000 to $50,000.

ITHACA, N. Y.—The bondholders of the Ithaca Telephone Company have been paid their semi-annual interest.

BELMONT, O.—The stockholders of the Farmers' Telephone Company met at Centerville recently and chose officers for the ensuing year. They voted to increase the capital stock $1,000. The line originally extended from Jacobsburg to Centerville, a distance of four miles. The line now has branches to Glencoe, Armstrong's Mills, Warnock and Bethel.

HUNTINGDON, PA.—The Huntingdon and Clearfield Telephone Company has increased its capital stock from $300,000 to $500,000.

FRANCHISES.

REDONDO, CAL.—The Home Telephone Company has made application for a franchise here.

VENTURA, CAL.—The Home Telephone Company, represented by E. A. Morris, has asked for a franchise here.

IDAHO FALLS, IDAHO.—Col. Thomas R. Hamer, of St. Anthony, was here recently endeavoring to secure a franchise for the Teton Telephone Company to construct and operate an exchange here.

COUNCIL BLUFFS, IA.—It is probable that Dr. D. Macrea, Jr., and T. D. Metcalf, representing the Western Iowa Independent Telephone, Telegraph and Terminal Company, will be granted a franchise to give Independent toll connections to Council Bluffs.

OTTUMWA, IOWA.—Citizens have voted a franchise to the Amador Farmers' Mutual Telephone Company to enter the city and install an exchange here.

SPENCER, IA.—At the municipal election, by a vote of 429 to 157, the Citizens Telephone Company, organized by local business men, was granted a franchise.

NEWPORT, KY.—The Ludlow Telephone Company, of Ludlow, O., will apply for a franchise for the operation of a new telephone system all over Campbell County. This means a spirited opposition to the Bell Company. The company has already asked for rights in Newport, Bellevue and Dayton.

GALESBURG, MICH.—The Citizens' Telephone Company of Galesburg has been granted a franchise to construct and operate a system here.

CAMDEN, N. J.—A resolution has been adopted authorizing the Eastern Telephone and Telegraph Company to erect poles in and along the county roads provided that the company furnishes free telephones along the lines and connections to the various county offices.

ELIZABETH, N. J.—The Central New Jersey Telephone Company has been granted a franchise by the New Brunswick Common Council.

PERTH AMBOY, N. J.—The Hudson & Middlesex Telephone and Telegraph Company is making every preparation to institute a service no matter what action is taken by the City Council. It was stated by one authority that it was the intention of his company to make every preparation so that no time will be lost should the council again refuse to grant them a franchise. Forty subscribers have already been secured and instruments have been ordered. In a few days more it is expected that this number will be enlarged to one hundred subscribers. In case the aldermen refuse to grant the franchise, the Hudson and Middlesex Company will enter the city over a private right of way, part of which has already been secured.

ATTICA, N. Y.—The board of trustees has granted a franchise to the Inter-Ocean Telephone and Telegraph Company to string wires in the village.

BERLIN, O.—The Berlin Telephone Company has been granted a franchise at Millersburg.

FLEETWOOD, PA.—An ordinance has been posted by town council granting the Consolidated Telephone Company the right to erect poles through town.

NORRISTOWN, PA.—At a recent meeting of the Town Council, the Montgomery Subway Company was given permission to lay conduits in the streets of Norristown. These conduits are to convey electric light, telephone and telegraph wires, which will not be allowed to be strung overhead hereafter.

COMPETITION.

MOLINE, ILL.—The Aldermen have passed by unanimous vote the ordinance repealing the franchise of the Central Union Telephone Company to operate in this city.

HAZLETON, IND.—By continually raising its rates for service here, the

THE WEEK'S MESSAGES—Continued

Bell Telephone Company has been practically forced from the field. It formerly had about 175 subscribers, but nearly all of them have discontinued the Bell service. The Independent Telephone Company, of Princeton, is extending its lines to Hazleton, and will establish an exchange here. It will connect with the Knox Telephone Company of Vincennes.

PATOKA, IND.—The Independent Telephone Company, of Princeton, has extended its lines to this place, and is now competing with the Bell Company.

COMBINATIONS.

MUSKOGEE, I. T.—All the Independent telephone interests in this territory, Oklahoma and Northern Texas have been merged into the North American Telephone Company. The plans of the North American Company contemplate connection with Kansas City lines at Chetopa, Kan., and to control a great many systems in Southern Kansas and lines to be built from St. Louis to Joplin.

LONDON, KY.—J. W. Creech, of East Bernstadt, and a number of business men associated with him have purchased the London Telephone exchange from N. Starkey for $10,000. Mr. Starkey has gone to Pineville to take charge of the telephone exchange at that place, which he recently acquired.

FAIRFAX, MO.—A meeting of the Mutual Telephone Company, of Atchison County, was held in Fairfax recently. It is probable that a local organization will be formed here to join with the county organization, and the mutual service will thus cover the county. It is also probable that the Fairfax exchange will be bought and merged into the mutual concern.

MARION, MO.—Negotiations are pending for the purchase of the Marion telephone exchange by a Carbondale syndicate, composed of Judge O. A. Harker, Hon. W. A. Schwartz, J. B. Bundy, D. M. Parkinson and George M. Harker, the present owners, Joab Goodall and S. H. Goodall to retain an interest.

NICKELLTON, MO.—The 16 to 1 telephone holders consulted with the Nickellton Telephone Company at Independence school house recently to try and purchase the telephone line from the Shelby County line to Eagle & Son's store.

PLEASANT HILL, MO.—The McDonald Bros.' Telephone system has been purchased by the Rock Island Telephone Company, recently incorporated by Kansas capitalists and W. Adams and W. B. Scruggs, of Harrisonville.

BEAVERKILL, N. Y.—The Beaverkill Telephone Company has leased its line to Fred. Dieckmann, of Rockland, for a term of five years, with the privilege of buying. The whole system is being overhauled and a line extended to Spring Brook.

ELECTIONS.

ARMINGTON, ILL.—The Armington Telephone Company has elected the following officers: President, C. Darnell; treasurer, Frank Boyer; clerk, C. B. Hanger; directors, J. E. Kelly; George Cruse, A. F. Hoerr.

GOLDFIELD, IA.—A meeting of the Goldfield Telephone Company was held recently, and the following board of directors were elected to hold office until the first annual meeting of the company: W. V. Palmer, Howard Crill, Dan Stephens, John Montgomery, Chas. Bowers, B. W. McElhinney, L. A. McIntyre. The company expects to begin work on the line as soon as the organization is perfected. It will build an exchange in town and several rural lines.

ALMA, MICH.—At the annual meeting of the stockholders of the Union Telephone Company the former directors were re-elected as follows: J. H. Tilden, J. T. Millman, C. T. Babcock, Thomas Bromley, S. E. Parkill, C. W. Gale, T. Kincaile, J. W. Robison, W. O. Mason, G. S. Ward, J. P. Gibbs, G. H. Laflamboy. The officers elected were: President, Stanley E. Parkill; secretary, J. H. Tilden; treasurer, G. S. Ward.

DRYDEN, N. Y.—Enough stock in the Dryden Village Home Telephone Company having been sold to warrant an organization, the following directors have been chosen: Chas. E. Green, Walter W. Angell, Chas. Mason, Avery Hiles, R. F. Chappuis. The directors elected Alfred Myers, president; R. F. Chappuis, secretary, and Walter Angell, treasurer.

EAST STROUDSBURG, PA.—At a meeting of the Monroe Telephone Company, held in the office of C. B. Staples, the following directors were elected: J. S. Schoonover, E. F. Peters, C. B. Staples, W. A. Erdman and B. D. Hursh, with Mr. Schoonover as president, Mr. Staples as secretary and treasurer, and B. D. Hursh as superintendent and general manager. Mr. Peters and Mr. Schoonover were appointed a committee to visit Mt. Pocono, and if a satisfactory number of telephones could be secured, to establish an exchange there. A copper cable line will be placed from here to Tannersville.

MISCELLANEOUS

CLEVELAND, OHIO.—The Standard Telephone and Construction Company of Cleveland has changed its name to The Logan Home Telephone Company.

PLEASANT CITY, OHIO.—At a meeting of the Farmers' Rural Telephone exchange held in Caldwell the Pleasant City Telephone Company made a proposition to establish an exchange in the town.

EAST AURORA, N. Y.—The Haines Telephone Company is now operating a telephone exchange with 140 subscribers, which includes nearly every business house in town.

PERSONAL

GREAT BEND, KAN.—Mr. Carl Stromquist, who has been local manager of the Grimes Bros.' Telephone and Power Company for several years past, has resigned his position here and will go to Chicago, where he will enter a large telephone manufacturing plant.

New Construction in the Field

SOUTHBURY, CONN.—The Stone Telephone Company, of Southbury, is making preparations to extend its line from Oxford Center to Seymour.

CHICAGO, ILL.—Within the next thirty days the Chicago Great Western Railway will commence the work of constructing a private telephone system between three terminal points, Chicago, St. Paul and Kansas City. The first line will be from Chicago to St. Paul, where the general offices of the company are located. The other line will run from Kansas City to Olewein and will connect with the St. Paul and Chicago line. The cost of the system will be in the neighborhood of $20,000.

CHICAGO HEIGHTS, ILL.—The new building for the Chicago Heights Telephone Company is completed and work will soon be begun to install the switchboard and exchange equipment.

DECKER, IND.—The Knox Telephone Company of Vincennes has extended its lines to Decker and now has 34 subscribers here.

ORANGE, IND.—The Orange Mutual Telephone Company has its material on the ground and will begin work on its plant immediately.

TIPTON, IND.—Work has been started on an exchange at Windfall by Joseph A. Glass, who is preparing to establish a telephone system in that place. A long distance line will also be built from Windfall to Hobbs, connecting with the New Telephone Company.

WINAMAC, IND.—The Winamac Telephone Company will make additional improvements to the line, adding 2,500 feet of cable, etc.

FREMONT, IA.—The officers of the Farmers' and Traders' Telephone Company met in Fremont recently and decided to construct a new copper toll line from Butler to Oskaloosa. The Hedrick Telephone Company agrees to come as far as Butler with a copper wire and connect onto the Fremont line.

LIBERTYVILLE, IOWA.—The Libertyville Telephone Association is putting up the wire for its new telephone system. It will soon be ready for business.

LIVINGSTON, IA.—The Livingston Rural Telephone Company is laying out the line and has already commenced work. The officers are: A. D. Baker, president; Lucien Doolittle, vice-president; E. Merry, secretary; M. J. Aylor, treasurer; R. E. Muir, electrician.

ROCKWELL, IA.—The Western Electric Telephone Company now has a gang of men here at work under the supervision of Mr. A. H. Renney, setting the poles, stringing wires, etc. A telephone exchange is to be installed.

TRACY, IA.—The Mutual Telephone Company's line from the neighborhood of Olivet has been connected with the switchboard in the city. The company has a large number of farmers' telephones, and is meeting with considerable success. The principal promoters of the company are: Dr. Faqua, A. Laughlin, William Tandy, I. Barnes, Frank Barnes, Geo. Barnes.

ARGONIA, KAN.—The Home Telephone & Electric Company has pur-

THE WEEK'S MESSAGES—Concluded.

chased a building and will establish a central office as soon as their new rural lines and local exchange are ready for business.

KENSINGTON, KAN.—A rural telephone line will run out from Kensington to Tyner with twenty-five patrons to start with. It will connect with the system at Kensington, and will be under control of L. C. Ahlborn and Allen Sanford, the local capitalists.

KINGMAN, KAN.—If enough subscribers can be secured the Kingman Telephone Company will establish a telephone exchange in Norwich city. The Norwich City Council has granted the company a twenty-year franchise.

LA CYGNE, KAN.—W. A. Gage, who lives on Route No. 1, was in the city recently. He is preparing to run a rural line east from La Cygne to Amsterdam. A branch line will be run into Valley township and from there to Pleasanton.

SHARON SPRINGS, KAN.—Sharon Springs will soon have telephone connections with Wallace, a distance of about twenty-five miles. A portion of this line will be attached to the barbed wire circuit, now becoming generally used in this part of the country.

WESTMORELAND, KAN.—W. F. Peters, of Winkler, and V. E. Johnson, of Randolph, were in this locality recently getting subscribers for a telephone line. The Peters & Grob Telephone Company will build a line to connect with the Peter lines at Cleburne and Randolph.

ABBEVILLE, LA.—It is probable that the Teche & Vermillion Telephone Company will extend its lines from here to Gueydan, and install an exchange there.

FREDERICK, MD.—The Frederick County Telephone Company has completed the extension of its system to Burkittsville.

SALISBURY, MD.—The Garrett County Telephone Company has made extensions from Friendsville north to the Pennsylvania State line, to connect with the Confluence and Ursina Company's lines, and west to the West Virginia State line, where it connects with Grafton, Fairmont, Morgantown, Kingwood and intermediate points.

CHELSEA, MICH.—The Chelsea Telephone Company anticipates extending its line south on the Manchester road from the present terminus.

GRAND RAPIDS, MICH.—Secretary E. B. Fisher and Manager C. E. Tarte, of the Citizens Telephone Company, have returned from Rockford, where they inspected the local exchange and made arrangements for additional service. The system there is growing so rapidly that it will probably become necessary in the near future to install additional switchboard capacity.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company is contemplating additional extensions to its toll line system between Holland, St. Joseph and Benton Harbor. The line will cost in the neighborhood of $20,000.

KALAMAZOO, MICH.—Manager D. L. Berry has accepted the franchise granted the Citizens' Telephone Company. This franchise provided that the city shall be paid a license fee of 50 cents a year on each telephone. The company will begin the construction of its conduit system at once.

AUSTIN, MINN.—Charles H. Webber and C. L. Thomas, of this city, who are interested in the new company which will install a telephone system here, say lines will be built to Minneapolis, La Crosse, Winona and other cities.

KANSAS CITY, MO.—The Home Telephone Company has been granted a permit for its central exchange building. The building will cost $40,000.

LA GRANGE, MO.—The various telephone companies coming into La Grange, consisting of the La Grange and Canton Telephone Company, the Prairie Telephone Company, the Highland Telephone Company, the Wyaconda Telephone Company, the Bozarth Telephone Company and the Lindale Telephone Company No. 2, will hold a meeting at this place April 18, 1903, for the purpose of installing a switchboard here.

LA GRANGE, MO.—Silas Lake, manager of La Grange Telephone exchange, will improve the central here by adding a workshop and a private booth. He will also install a number of new telephones soon. A new directory has been published which contains over 100 names. The old directory contained less than 60 names.

HAVRE, MONT.—Ranchers living on Clear Creek, near this city, are interested in securing a connection with the Havre Telephone exchange. They have taken the matter up, and it is probable that the local company will extend the line out into the mountains.

LEBANON, N. J.—The Lebanon Telephone Company has commenced erecting its line between Stanton and Morristown. The line will connect the towns of Lebanon, Stanton, Whitehouse, New Germantown and several other places with the Flemington system. The company will connect many towns in Hunterdon, Morris, Warren and Somerset counties within the next few months.

BUFFALO, N. Y.—The Interocean Telephone Company expects to complete its line between Penn Yan and Geneva through Halls by May 1.

FREEHOLD, N. Y.—Albertus Becker and Milton and Henry Phinney are at work raising funds for a telephone line to connect with Cairo and East Durham.

LIVONIA, N. Y.—C. E. Hartson, superintendent of the Livonia Telephone Company, has installed a local telephone exchange at Bergen, N. Y. He has taken another contract to install an exchange at Barker, and has gone there to fulfill his contract. He will be assisted by Arthur Peck.

PERRY, N. Y.—Representatives of farmers in this vicinity will confer with the Perry Telephone Company and the Castle Telephone Company to ask them to construct a line.

CANTON, OHIO.—H. B. Grauel, of Rochester, N. Y., is putting in the new telegraphone system at Canton. All the stations along the Wheeling and Lake Erie Railroad are to be equipped with the new system which makes use of the telegraph wires for telephoning.

PLEASANT CITY, OHIO.—Carlos Stranathan, of the Stranathan Telephone Company, of Pleasant City, will extend his line in the near future.

BLOSSBURG, PA.—The Farmers' Mutual Telephone Company held a meeting here recently and decided to enlarge the capacity of the central office, and extend the lines.

BRADFORD, PA.—The Union Telephone and Telegraph Company has arranged to give its subscribers long distance service to the following points: Ashville, Westfield, Brocton, Little Valley, Kennedy, Cattaragus, Dunkirk, Frewsburg, Fredonia, Jamestown, Panama, Mayville, Randolph, Ripley, Salamanca, Silver Creek, Watts Flatts and Sherman. The company expects soon to be able to give long distance service to points in central and western New York, including Buffalo, Rochester and Syracuse.

MAHONY CITY, PA.—R. J. C. Foye has been awarded the contract to erect a telephone line from Delano to Tamanend and Quakake for Dr. Flexer.

BRUCE, S. D.—M. E. Hall, a local capitalist, is interesting the farmers of this vicinity in the proposition of constructing a local telephone system at this place, with several lines running to farms.

GONZALES, TEXAS.—The Gonzales Telephone Company is constructing a telephone line to the oil fields.

TRADE NOTES

The R. M. Patrick Electric Contracting Company has been organized to do a general electric contracting business, including the installation of telephone, power plants, etc. The headquarters will be at 218-220 Kirk Building, Syracuse, N. Y. The company has secured the services of a corps of experts in all lines of electric work. R. M. Patrick is manager of the company, Fred D. McIntosh, treasurer, and Bert H. Shepard, engineer.

The Stromberg-Carlson Telephone Manufacturing Company, as a souvenir of his visit to Chicago, presented President Roosevelt on April 2d a gold paper weight. It was a reduced model of the Stromberg-Carlson receiver, mounted on a base to which was fastened a silver plate, bearing the words "To the President." The President has acknowledged this souvenir in a letter to the Stromberg-Carlson Company, assuring it of his appreciation.

The Keystone Electric Telephone Company, of Pittsburgh, Pa., has just completed a system of private exchanges in the Farmers Bank building. In the Colonial Printing & Lithographing Company's building it has installed 15 telephones, and 12 telephones in the Keystone Bank building. Other contracts which it has filled recently are 5 telephones at Wickes Brothers' plant, 5 at the offices of the American Water Works and Guarantee Company, 6 in the Frick building, and numerous extensions in the plant of the La Belle Steel Company.

The Pittsburgh Private Telephone Company has just finished a system of 16 telephones at Rosenbaum's department store in Pittsburgh. It has also installed 30 telephones at the American Water Works & Guarantee Company's plant, and 10 telephones at the offices of the Ohio & Pittsburg Milk Company. Other contracts which it has filled within a few weeks are 10 telephones at Brace Brothers' laundry; 12 telephones at K. Solomon & Company's department store, and 10 telephones at the plant of the American Steel & Wire Company at Braddock, Pa.

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AN AUTOMOBILE FOR DRAWING CABLE IN CONDUITS

By Terrell W. Croft and Earl F. Edmunds.

It now looks as though the old style man-power windlass, that has been used since the first cables were pulled into underground conduits, is doomed to follow in the way of other discarded telephone apparatus. The new device is an automobile truck, furnishing power for its own propulsion and also for drawing cable in and out of underground conduits. It is at present in actual use by the New York Telephone Company, which has given it the severest tests for two or three months, all of which the automobile has stood with the utmost satisfaction. It is almost certain that the Independent telephone companies will keep to their high standards and adopt this new method as being more economical, quicker and better in every way than the manual way of drawing in cables.

The apparatus is a large, heavy, truck-like automobile, driven by electricity. The photographs show the details of operation. Fig. 1 is a front view, showing an upright device which carries two pulleys for the pulling steel cable, and which is let down into the manhole when in operation. When not in operation, it may be raised up by the power of the same windlass that pulls the cable and fastened by set screws. This photograph also shows the controlling apparatus for operating the pulling motor. The motor itself is concealed under the driver's seat. Fig. 2 is a view of the inside of the truck from the rear. It shows how the bed of the wagon may be used for carrying tools, wire, etc. In the background a man is shown pulling the slack of the steel drawing cable, and keeping its grip on the drum. The double reduction gearing from the motor is also seen. Fig. 3 is a general view of the automobile, showing the construction gang loading tools, etc., into its bed.

Power for the cable pulling drum is furnished by a General Electric four-pole special enclosed automobile motor of the series type. It has a nominal rating of two horse-power, but is designed to operate on a 100 per cent. overload for two hours and on a 200 per cent. overload for twenty minutes. The motor drives the drum through a double-reduction gearing, which, with the overload capacity of the motor, gives the apparatus enormous tractive power.

The same battery which operates the truck motors furnishes power for the cable pulling motor. The battery consists of forty-four cells of the "Exide" type, manufactured by the Electric Storage Battery Company. Each of these gives an average of two volts, making a total of 88 volts. The speed of the cable pulling motor is controlled by the arrangement

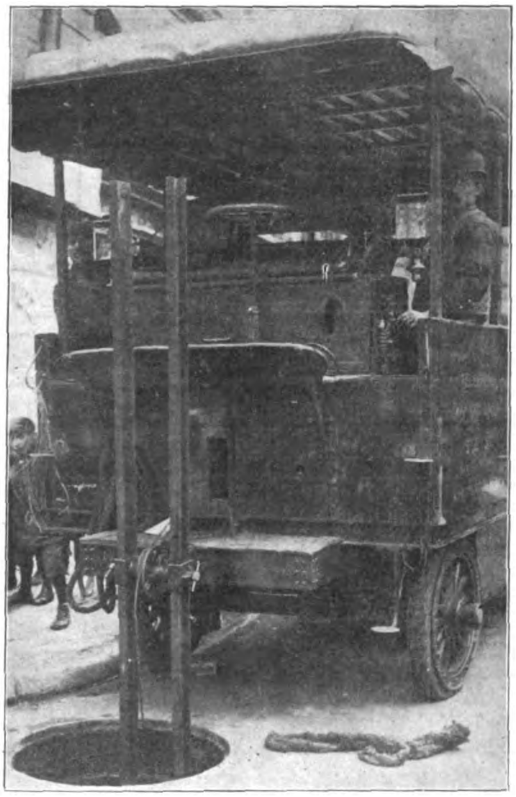


FIG. 1—PULLING CABLE AND DEVICE IN MANHOLE.

FIG. 2—REAR INSIDE VIEW OF TRUCK.

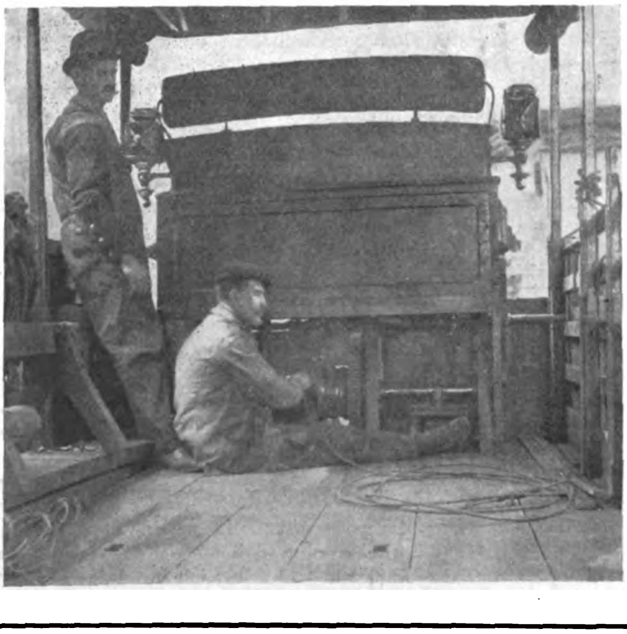
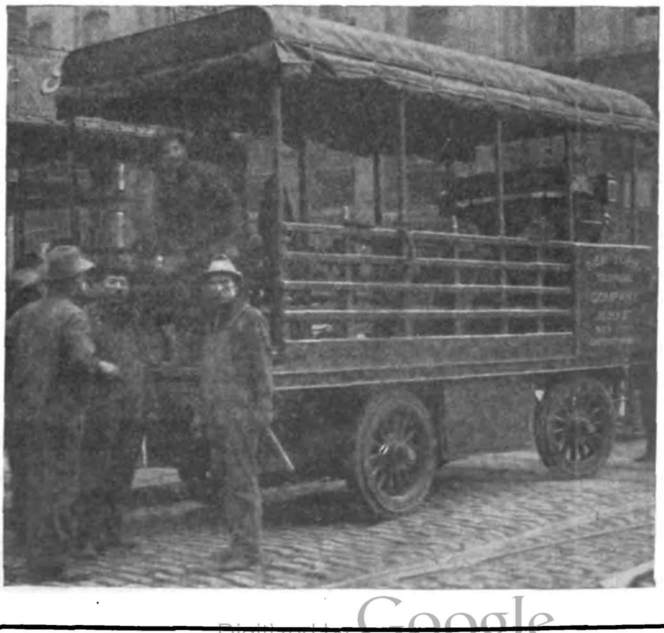


FIG. 3—GENERAL VIEW OF AUTOMOBILE.



shown diagrammatically in Fig. 4. When the controller arm, which is pivoted centrally, is in a vertical position, no current flows through the motor. If the arm be moved to the right of the central position, the motor will be connected in series with the resistance across the battery. By further turning the arm, resistance is cut out until at the last contact button the motor is connected directly across the battery. By turning the arm to the left, the effect is the same, but the flow of current through the motor is reversed, causing it to rotate in the opposite direction. The same resistance is used for both sets of contact buttons, as shown in the diagram. The path of the current through the motor is from battery through switch and field coil of motor to inner contact ring; from contact ring through revolving contact spring to contact segment, through motor armature, other contact segment, contact spring, resistance, switch and back to other terminal of battery.

The motor is adapted to give three pulling speeds, 10, 30 and 40 feet of cable per minute. It can pull an average in eight hours of 6,000 feet. Telephone men who have used only the hand windlass can see from this how much more rapid the new method is over the old. Fewer men are required in the actual working of the truck than are necessary with the hand windlass. The New York Telephone Company in actual practice has the same number of men, but they are necessary only for rolling the reels into position, opening the manholes, arranging the pulling connections and paying out the cable from the reels. When it is considered how rapidly the new method pulls the cable, it can be understood that a larger force is needed to make the preliminary arrangements in order to keep pace with the apparatus. One charge of the storage batteries is sufficient to propel the automobile twenty miles and leave enough current to pull cable the remainder of the working day. The cost of a charge per working day with current supplied at four cents per K. W. H. is $1.07.

Tel. Line Construction I. III. Fig 25

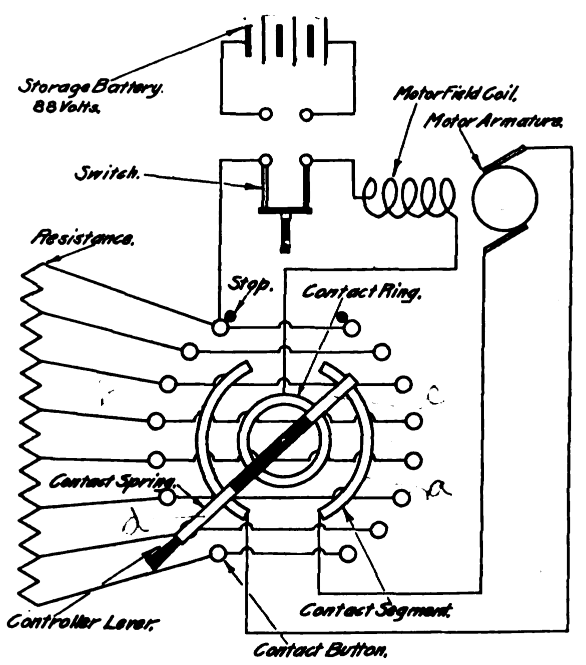


FIG. 4—DIAGRAM OF MOTOR CONNECTIONS

4 3/4"

4 3/4

On days when there is no cable to be drawn into conduits the automobile is utilized as an ordinary truck, easily performing the work of a couple of two-horse trucks. In this capacity it is used for conveying the heavy cable reels from one part of the city to another or for other general trucking purposes. The cable pulling drum is then reversed and used for loading and unloading the reels, etc.

It is also frequently run out for the sole purpose of furnishing illumination for the interior of manholes when repairs are to be made. Special 88-volt incandescent lamps are used, furnished with a long flexible conductor, the lamps being protected by a wire screen from breaking. The storage battery furnishes the current for operating the lamps, and the work of making repairs in the ordinarily dark manholes is greatly facilitated.

The automobile is kept in order and the batteries charged by the Rainier Company, general sales agents for the Vehicle Equipment Company, which built the truck. A low estimate places the work it does as being twice that daily performed by a gang of men using the hand windlass.

The automobile is sixteen feet long and seven feet in width. The wheels are under the body of the truck. Its total weight is four and one-half tons. The battery alone weighs 2,800 pounds. The truck is guaranteed to carry a weight of five tons fifteen miles, and, on the same charge, furnish current for three continuous hours of cable pulling.

TELEPHONE EXCHANGE ENGINEERING—ARTICLE VIII

By Ray H. Manson, Albion D. T. Libby and Charles A. Simpson.

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SUBSCRIBERS' TRUNK CIRCUIT.—Fig. 3 shows the incoming trunk circuit. That portion of the circuit to the left of the dotted line is at another common battery exchange, while that to the right of the line is at the exchange considered. All the apparatus except the repeating coil, condenser and generator with interrupter for ringing, is mounted at the trunk position in which the line is located. Each incoming trunk terminates in a cord and plug.

Suppose party "A" connected with an exchange "A¹" wishes to talk to a party "B," connected with the exchange under consideration "B¹," he will get the operator at office "A¹" as described. The operator at "A¹" office, after obtaining the number, presses order wire key "B¹." This connects her telephone with the telephone of the trunk operator "B¹." The operator "A¹" repeats over the order wire the number desired. The trunk operator at "B¹" designates over the order wire the trunk to use, e. g. suppose the number wanted is "B¹" No. 543. The trunk operator would say No. 543 on No. 10. The operator at "A¹" then inserts her calling plug into the outgoing trunk jack corresponding to the trunk designated. This causes battery to flow from "B¹" (Fig. 3) through the five hundred ohm relay through winding No. 1 of the repeating coil, out on to the tip side of the calling cord (Fig. 2) of operator at "A¹" through winding No. 2 of repeating coil to ground. The 500-ohm relay then operates, allowing battery to flow through the 12-volt lamp through the 40-ohm coil, contact of the 500-ohm relay, to back contact of 83½-ohm relay, through the 83½-ohm coil to ground, lighting the supervisory lamp. When the trunk operator sees this signal she knows that the operator at "A¹" has taken the right trunk, and she will test the line called for to see if it is busy. If the line is busy there will be a flow of current from the jack sleeve through to the back contact of the 83½-ohm relay through the tertiary winding of the operator's induction coil to ground, producing a click in her telephone. If the line is not busy she inserts the plug. The insertion of the plug will allow battery to flow through the supervisory lamp, through the winding of the 83½-ohm relay through the sleeve of the plug and jack, through the cut-off relay (Fig. 1) to ground. The cut-off relay for the called for subscriber's line will operate and cut off battery from the line lamp and relay connected thereto, so that no signal will be given to the subscriber's operator in front of whom the line terminates, and since this jack is multipled at each section, any operator testing this line will get a busy signal.

When the 83½-ohm relay operates, the two armatures are drawn up and make contact with the front contact springs. This will connect the tip of the plug through one inside contact of the machine ringing key, through winding No. 2 of repeating coil to ground. The other armature makes contact with the spring having battery connection. Battery will then flow through this contact, the armature of the relay, through contact at the 500-ohm relay, through the 40-ohm coil, then through the 83½-ohm relay, through cut-off relay (Fig. 1) to ground. Battery also flows through the supervisory lamp to ground in conjunction with the current coming through the 40-ohm coil. This coil is a shunt around the lamp, and is sufficient to extinguish it.

At office "A¹," the sleeve of the outgoing trunk jack, is connected through a 30-ohm resistance to ground, so that when the calling plug is inserted into a regular multiple jack the sleeve is grounded through the 30-ohm cut-off relay, which gives the necessary resistance in the local sleeve circuit for operating the supervisory signal.

The coil then takes the place of the cut-off relay so far as the resistance is concerned to get the right current (.1 ampere) through the supervisory lamp. If no resistance was provided, the supervisory lamp would be burnt out. There must be approximately one hundred and twenty ohms in series with the supervisory lamp, when it is lighted. From this it will be seen that the supervisory lamp on the calling cord of the operator at "A^1" will be lighted when she plugs into the outgoing trunk jack.

After the trunk operator plugs into the line wanted she pushes down the red button on the machine ringing key, which locks itself. This connects the interrupter for machine ringing across the line through the release magnet of the key. The interrupter is so constructed that battery is on the line for five seconds and generator one second, alternately. The subscriber's bell will ring until he removes his receiver. Then the key will be tripped by reduced resistance, for when the receiver is on the hook the bell and condenser offer a resistance of about thirteen thousand ohms, and when off the hook about eighty ohms. The release magnet of the key has a copper shell next to the iron core which acts like a short-circuited secondary of a transformer and lowers the self-induction of the coil so that it offers less impedance to the ringing current. Battery is provided on the interrupter so that should the subscriber take his receiver from the hook while battery is on, the key will trip and he will not be rung in the ear. There is no battery current when the receiver is on the hook, owing to the condenser, but the key is released as explained, and the 20-ohm supervisory relay will be operated by the battery flowing through winding No. 3 of the repeating coil, through the 20-ohm relay to the line, back to winding No. 2 of repeating coil to ground. The operation of 20-ohm relay permits battery to flow from office "A^1" (Fig. 2) through winding No. 3 of the repeating coil and 20-ohm relay out on the ring side of the trunk to office "B^1" (Fig. 3), through winding No. 4 of repeating coil, through contact at 20-ohm relay to ground. The supervisory lamp on calling cord at "A^1" will go out, telling the operator that the called for subscriber has answered. After conversation is completed, the parties hang up and the subscriber's operator at "A^1" will get a disconnect on both her cords on account of both the 20-ohm relays (Fig. 2 and Fig. 3) falling back. The subscriber's operator at "A^1" will then withdraw both her plugs. When she does this, the ground at "A^1" exchange is taken off the 500-ohm relay at "B^1" exchange, allowing it to fall back. This will remove 40-ohm shunt around the supervisory lamp and it will light, giving a disconnect signal to the trunk operator, who will withdraw her plug.

It will be noticed that the trunk operator has no means of talking to a subscriber. If, on testing a line, she finds it "busy," she must notify the calling subscriber and the subscriber operator that the line is busy. She does this by plugging into a "busy back" jack located in her position which causes a buzzing noise to be transmitted to the party calling, also flashing the supervisory lamp in front of the subscriber operator. If the subscriber does not answer, the trunk operator plugs into another jack called the "don't answer," first resetting the machine ringing key by pressing the black button. The operation of these special jacks and the interrupter for giving the signals will be explained under the "Power Plant."

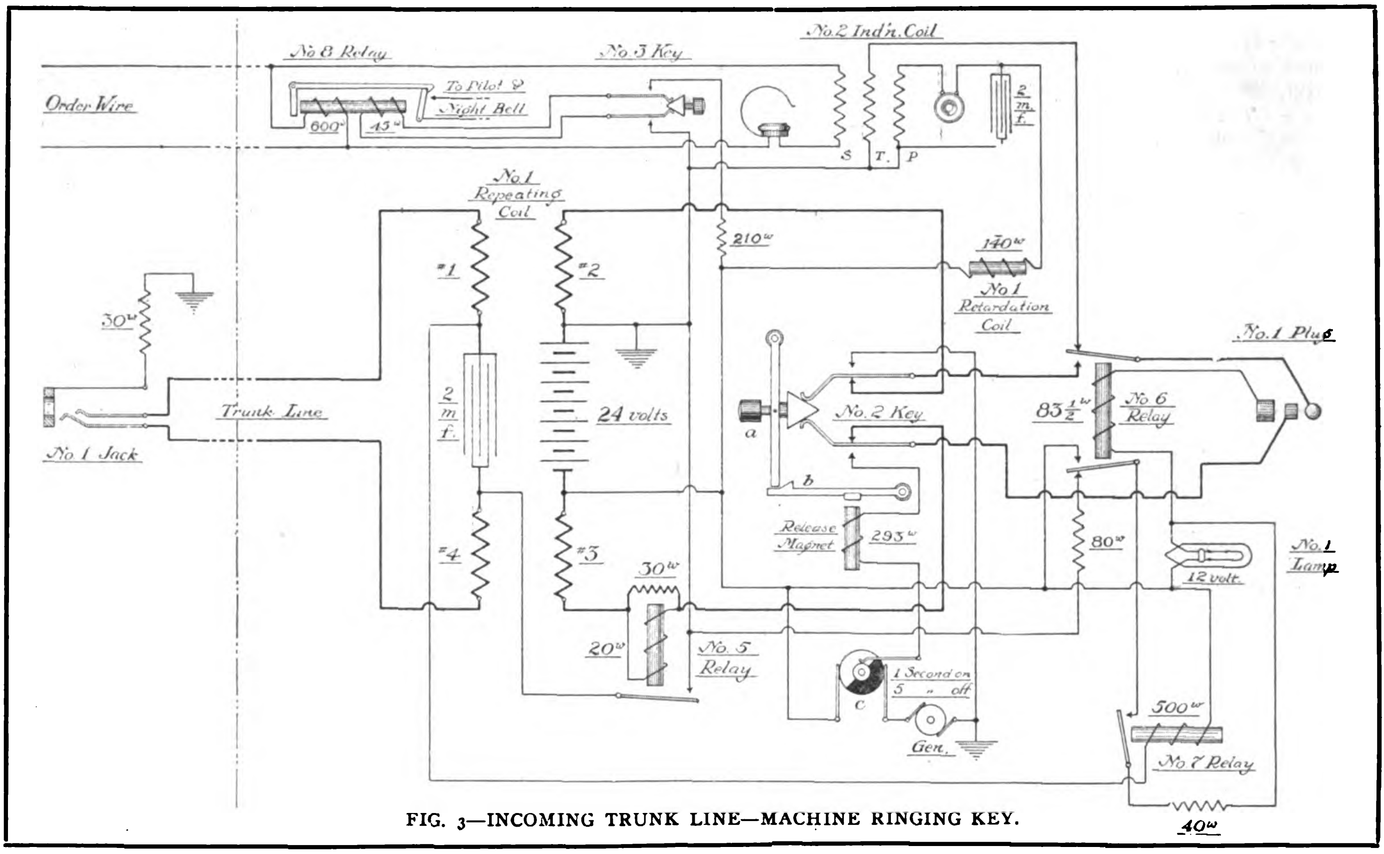


FIG. 3—INCOMING TRUNK LINE—MACHINE RINGING KEY.

At night, when but one trunk operator is on duty, it must be possible to signal her, for she cannot have her head telephone in circuit with all the order wires. This is done as follows: A call comes in at office "A^1" and is answered by the operator there in the usual manner. The operator, after receiving the number wanted, presses the button of the order wire key marked "B^1" and at the same time presses the ring down key, putting generator on the order wire circuit to office "B^1." Referring to Fig. 3, it will be seen that the generator current operates the No. 8, or order wire pilot relay, which causes the pilot lamp to light and the night bell at office "B^1" to ring. The trunk operator, seeing the pilot, goes to that position, presses a common key at said position, which puts battery through the 210-ohm coil and the self-restoring winding of the relays to ground, restoring the order wire pilot relay. At the same time she inserts her head telephone plug into the "cut-in" jack and receives the number from the subscriber operator at office "A^1," also giving her the number of the trunk to use. The connection is completed as previously described.

Disconnect signals at night operate in the same manner as during the day.

In the cord and trunk circuits (Figs. 2 and 3) the 20-ohm relay is shown with a 30-ohm shunt across its terminals. This represents a non-inductive German silver coil, which is wound on the outside of the copper wire winding of the relay spool. Its object is to afford a better passage for the voice currents.

ELECTRICAL MEASUREMENTS—ARTICLE XII—GALVANOMETER TESTS

By Arthur Vaughan Abbott.

HAVING completed a survey of special forms of galvanometers, let us return to a consideration of tests which may be made with those instruments described upon pages 89, 101 and 122 of THE AMERICAN TELEPHONE JOURNAL. The simplest test which can be made with a galvanometer is that of the measurement of resistance. Suppose the apparatus to be arranged as shown in Fig. 1, in which G is the galvanometer and E any battery, while R, r and r^1 are various resistances. Let us suppose that the resistance r be known, and for this purpose one may use either a resistance box similar to those which have already been described, or may couple up a number of known resistances, such as ringer magnets, relays, etc. Let G equal the resistance of the galvanometer, R the unknown resistance which it is desired to measure, and r^1 the resistance of the remainder of the circuit, namely, the battery, leads, etc. Let us also assume that E is the electromotive force of the battery and I the current produced in the circuit. Now, by Ohm's law, the following relations will hold true:

$$(1)\quad I = \frac{E}{G+r^1+r} \text{ and } I\ (G+r^1+r) = E$$

Now for the known resistance r, let us substitute the unknown resistance R; under these circumstances there will be a different current in the circuit, which we may represent by I^1; then

$$(2)\quad I^1 = \frac{E}{G+r^1+R} \text{ and } I^1\ (G+r^1+R) = E$$

As the left-hand sides of both of these equations are equal to the same quantity, E, they are equal to each other, and may be written thus:

$$I'\ (G+r'+R) = I\ (G+r^1+r)$$

solving for R we have:

$$R = \frac{I}{I^1}(G+r+r^1) - (G+r^1)$$

But the deflections of the galvanometer are proportionate to the currents I and I^1, and hence for $\frac{I}{I^1}$ we may substitute $\frac{d}{d^1}$, in which d and d^1 are the deflections read upon the galvanometer with the currents I and I^1, hence $R = \frac{d}{d^1}(G+r+r^1) - (G+r^1)$. In this expression d and d^1 are known, as well as G, r and r^1, and consequently R can be immediately calculated, for example: Suppose $G = 200$ ohms

$r^1 = 10$ "

$r = 500$ "

$d = 40°$ "

$d^1 = 15°$ " then

$$R = \frac{40}{15}(200 + 500 \overset{+}{\cancel{\times}} 10) - (200 + 10)$$

$$R = \frac{40}{15}(710) - (210)$$

$$R = \frac{40 \times 710}{15} - 210 = 1683 \text{ ohms}$$

In describing this method of testing for resistance we have assumed that the readings of the galvanometer are exactly proportional to the currents producing them. Theoretically this is not true, for the deflections are not proportional to the current but the tangents of the angles of deflection are. Hence if the deflections are very large, or if the readings are made not with a reflecting galvanometer but one having a printed scale, the tangents of the angles should be substituted instead of the actual number of degrees of deflection. To measure resistance by this method one must know the resistance of the galvanometer, that of the battery and of all the rest of the circuit, as well as possessing a known resistance of fair accuracy and of a reasonable amount compared with the resistance to be estimated. In very many cases, such as the testing of cables, the resistance to be measured is so very large that the battery resistance and circuit connections may be entirely neglected, and oftentimes even the resistance of the galvanometer itself. If such is the case, the formula can be much simplified, so that if we neglect all but the galvanometer resistance it becomes:

$$R = \frac{d}{d^1}(G+r) - G$$

Further, if the unknown resistance r is an adjustable one, so that it can be varied in such a manner that $d^1 = 2\,d$, there is still further simplification, and under such conditions the formula becomes:

$$R = \frac{r-G}{2}$$

If, previous to making any resistance measurements, the galvanometer be calibrated it is possible to measure resistance by calculating simply from the deflections without the use of any known resistance other than that of the instrument itself. Thus, for example: Suppose it be ascertained by experiment that a certain gal-

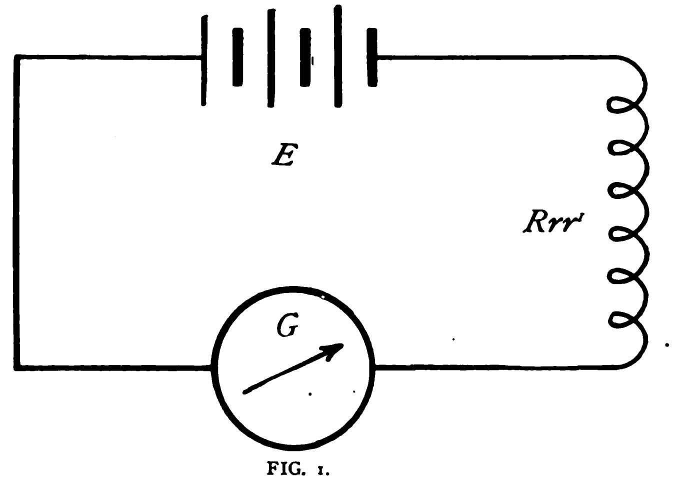


FIG. 1.

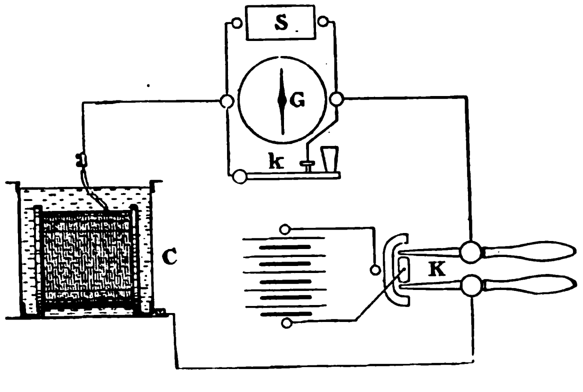


FIG. 2.

EDITOR'S NOTE.—The first article in this series appeared in the issue of January 17. They will continue many months.

vanometer, with a certain battery, gives a deflection of 40° through a resistance of 100,000 ohms. In comparison with this resistance that of the galvanometer and the battery is probably too small to introduce any sensible error. If, therefore, the galvanometer be connected with an unknown resistance and the same battery and the deflection be found to be 20°, it is obvious that the unknown resistance is 200,000 ohms, and, again if a deflection of 5° were found, the resistance would be 800,000 ohms. This co-efficient, namely, the amount of deflection that any galvanometer gives with a definite electromotive force in series with a unit of resistance is called the *"figure of merit,"* or *"sensitiveness"* of the galvanometer. Unfortunately, manufacturers have two ways of estimating the figure of merit. One way is to state the current in amperes that is required to produce 1° or one unit of deflection, and the other is the total resistance through which a difference of potential of one volt will produce one degree or one unit of deflection. Makers are now using the latter method for estimating sensitiveness. Such a galvanometer as is illustrated on page 101 may be built with varying degrees of sensitiveness, or, rather, supplied with tubes more or less sensitive, any one of which may be substituted for another, depending upon the kind of work to be performed. Thus a tube having a resistance of 20 ohms has a sensitiveness of about 75 megohms; that is to say, the galvanometer would show a deflection of 1°, when coupled up with a battery giving 1 volt, and a resistance of 75 megohms. A tube having a resistance of 200 will have a sensibility of 200 megohms, while one wound over a resistance of 1,000 has a sensibility of about 750 megohms, or will give one degree deflection with one volt through 750 megohms. If, therefore, the sensibility of the galvanometer in hand has been tested by the maker and is therefore known, resistance measurements may at once be made by simply connecting the galvanometer and battery of known electromotive force and the resistance to be measured in series and observing the deflection. Suppose, however, the galvanometer resistance be unknown, it must be measured and frequently no other instruments are at hand for the purpose. A slight modification in the method described may be used for this purpose. Suppose galvanometer to be connected with a battery of very low resistance—that is, low in respect to the galvanometer; for instance, if the galvanometer had a resistance of several hundred or thousand ohms, an ordinary battery, having a resistance not to exceed 4 or 5 ohms would introduce no very sensible error. The deflection of the galvanometer when connected with such a battery is to be noted. If additional resistance be inserted in the circuit so that the previous deflection be halved, it is evident that the resistance added is equal to the galvanometer resistance, which is thus very simply determined. Sometimes, however, it is more convenient to determine galvanometer resistance by using two known resistances. To determine galvanometer resistance in this way, the galvanometer, battery and one resistance, which we will term *r*, are connected, and the corresponding deflection, *d*, noted; then the second resistance, which we will term *R*, is added to the circuit, and the deflection thus produced, d^1, also noted; then the galvanometer resistance, *G*, is given by the expression:

$$G = \frac{R\,d^1 - r\,d}{d - d^1}$$

One method of measuring insulation resistance of an entire cable is shown in Fig. 2, in which the reel containing the cable is immersed in a tank of water. If any discontinuity of the sheath exists, it is immediately manifested by a more or less marked short circuit between the cable and the tank. Periodical tests on working telephone cables are, however, easily made by opening each pair of conductors to be tested and connecting the battery, galvanometer and wires to ground, the reading of the galvanometer, under such circumstances, giving immediately the insulation of the pair under examination. In case it is desired to test the insulation between two wires or two pairs of wires, it is only necessary to connect them at one end of the galvanometer and battery in series while the other end is open and measure the deflection. Knowing the size of the wires and the length under test, it is easy to determine very closely the actual resistance of the wires, which may be deducted from the measured resistance given by the galvanometer.

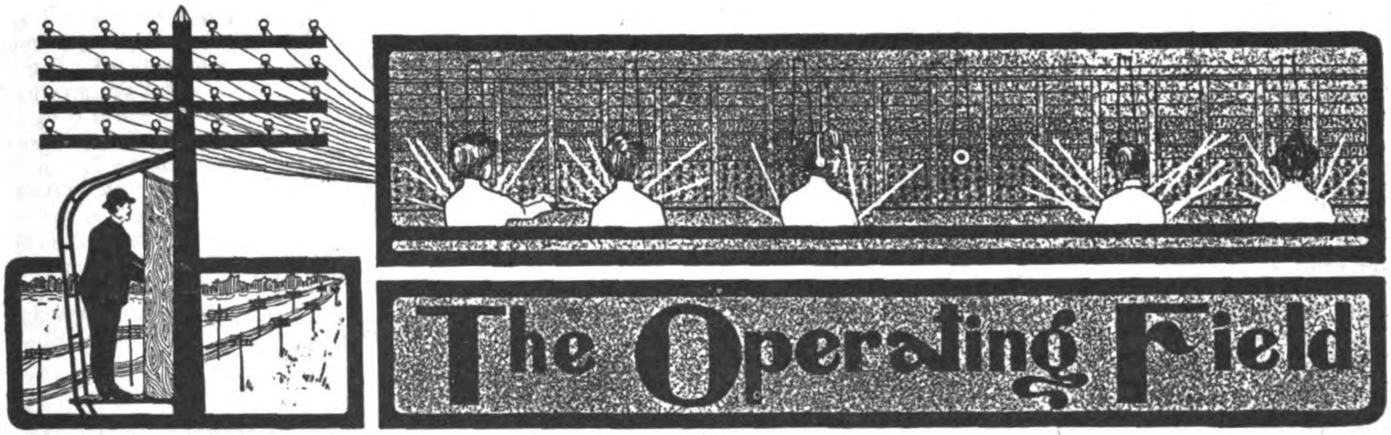
THE LONGEST SUBMARINE TELEPHONE CABLE

THE longest submarine telephone cable yet laid deserves an accurate record. Reference has been made to this cable which forms part of the new Anglo-Belgian telephone line, and M. Leduc, of the Belgian Telegraph Administration, has been good enough to read a paper before the Société Belge d'Electriciens, giving a complete description of the cable and of the work of laying it. The cable as laid is 47,276 nautical miles (approximately 54 statute miles) in length. Special difficulties attended the work of laying, owing to the shallow water, the long foreshore on the Belgian coast and the proximity of the telegraph cable, which had to be crossed, and the two cables kept sufficiently far apart to enable repairs to be made to either without danger of interference with the other.

The cable contains four cores, giving two telephone circuits. Each core consists of a strand of seven copper wires, weighing 160 pounds per nautical mile, equivalent to a copper wire of about .095 inch in diameter. Each conductor is covered with three layers of gutta-percha, the weight of the insulating covering being 300 pounds per nautical mile, making the total weight of each core 460 pounds per nautical mile. The four cores, together with strands of tarred hemp, were wound helically round a central strand of tarred rose, so as to form a cylindrical cable, which was covered with a stout tape specially treated, and over this covering was laid a brass ribbon, forming a continuous metal envelope to protect the gutta-percha from the attacks of the teredo worm, an insect which has a great liking for a costly meal of gutta-percha. Over a cushion of Russian hemp covering the brass envelope are laid the sixteen galvanized iron armor wires, each 28 inches in diameter, forming the outer protection of the cable. As will be understood from this description, the cable is a large one, the total diameter being nearly 2¼ inches and the weight 13.288 tons per nautical mile, or nearly five pounds per foot. The average deep-sea telegraph cable is less than an inch in diameter and weighs not much over a ton to the nautical mile.

The electrical conditions required by the specification were that the conductor resistance should not exceed 7.45 ohms per nautical mile, the electrostatic capacity .275 microfarad per nautical mile, and the insulation resistance be not less than 500 megohms per nautical mile, all at 75 degrees Fahrenheit. These conditions were satisfactorily met. Tests made after the cable was laid showed for resistance, 7.09 ohms per nautical mile; capacity, .266 microfarad per nautical mile, and insulation resistance over 1,000 megohms. The total resistance of each conductor of the completed cable was found to be 331.3 ohms and the total capacity 12.617 microfarads. The cost of the cable was about $2,900 per mile, and the total cost of the whole cable, including the work of laying, which, owing to various difficulties, occupied two ships a total of twenty-five days, amounted to $148,445. The total length of the London-Brussels line is 238 miles, the land line in Belgium being about 97 miles and that in England 87 miles. The charge for communication is to be $2 for three minutes, which, considering the high cost of the cable, can hardly be considered excessive.

Mr. Leduc concludes his paper as follows: "The laying of this cable will not fail to produce economic consequences of great importance. Submarine telephone cables supply a want that is continually becoming felt more and more, *viz.*, the suppression of distance. The new cable has just succeeded in overstepping the barrier that separates Britain from Belgium. It will, no doubt, be as regards submarine telephony, as it has been with telegraph cables and also with ordinary lines and wireless telegraphy, *i.e.*, we shall go on step by step. Every day we increase the distance —to-day 100 kilometres, to-morrow 1,000, and, finally, we may hope for the transmission of speech across the Atlantic. Perhaps this glorious feat is reserved for the Pupin system. The recent experiments of Siemens and Halske are full of promise as regards its realization." It is curious to read, in the same issue of the journal which reproduces M. Leduc's elaborate paper on a telephone cable fifty miles long, that the Telegraph Construction and Maintenance Company has during the last three years made and laid over 37,000 miles of submarine telegraph cable, and in that time has laid cables all round the world.



TOLL LINE COMBINATION.

By H. S. O'Brien, *Special Correspondent.*

INDEPENDENT telephone companies operating in Northern Indiana and Eastern Illinois sent representatives to a meeting at Logansport, Ind., on April 13, at which the Allied Independent Toll Company was organized. It will be incorporated under the laws of the State of Indiana. Officers were chosen as follows: Walter J. Uhl, of Logansport, president, and Henry A. Barnhart, of Rochester, secretary. The organization will be completed at another meeting to be held in Logansport on May 11.

The purpose of the new organization is to perfect a system of toll lines throughout the territory covered by the association in order to compete more effectually with the Bell company. It is believed that the Independent companies will meet with more success by combining their interests, and therefore all the long distance lines will be operated under one management.

A standing committee, consisting of C. A. Jay, Kokomo; Dr. John E. Yarling, Peru; Theodore Thorward, South Bend; Walter J. Uhl, Logansport; Henry Barnhart, Rochester; O. P. Freyberg, Lafayette; T. E. Hanaway, Monticello, and Abraham Halleck, Rensselaer, was appointed.

In addition to these gentlemen, the following representatives of Independent companies were present: J. F. Bruner, Remington, representing the Halleck Telephone Company; Steven Tudor, Citizens' Telephone Company, Kokomo; Dr. W. A. Huff, Peru Home Telephone Company; R. C. Stephenson, Rochester Home Telephone Company; O. Rex, North Manchester Telephone Company. Eight other companies, not represented at the meeting, sent letters endorsing the plan. The movement, it is said, will finally take in all the Independent plants north of Indianapolis.

TELEPHONE AN ISSUE IN POLITICS.

THE telephone is a prominent issue in the approaching mayoralty election in Moline, Ill. It will be remembered that the Moline council has passed an ordinance notifying the Central Union (Bell) Telephone Company to quit the city. This the Central Union will not do without making a very strong effort to stay. The fight which it has already started will cost thousands of dollars, and will mean that the city will face a crisis in economical and financial management. For this reason and others, the city more than ever before needs a very strong, clean-cut, thinking man—a man who has had experience in the fights of real life. It is to be hoped a mayor will be elected who is familiar with the past history of the Central Union in Moline and other cities, and who will show no signs of weakening before the threats and bluffs the Bell is sure to make.

ASSISTANT OPERATOR WANTED.

A GOOD opportunity for a young man who has had considerable experience in the operation of telephone systems is furnished by a vacant position as assistant telephone operator in the new Department of Commerce and Labor at Washington, D. C. When this vacancy is filled, applicants who have passed a successful examination will be kept on the eligible list, and will be appointed to similar vacancies as they occur. The salary of the position is $720 per annum, or $60 a month. Examinations will be held in every State in the Union and the Territories on May 26, 1903. Persons who desire to compete should apply at once to the United States Civil Service Commission, Washington, D. C., for application Form 1093, which should be properly executed and then filed with the commission at Washington. The examinations are open to all citizens of the United States who comply with the requirements. Competitors will be rated without regard to any consideration other than the qualifications shown in their examination papers, and eligibles will be certified strictly in accordance with the civil service law and rules. Applicants must be at least 20 years of age. The examination will consist of the following subjects: Spelling twenty simple words in ordinary use, 14 per cent.; arithmetic, simple tests in addition, subtraction, multiplication and division of whole numbers and United States money, 14 per cent.; writing a letter of not less than 100 words on some subject of general interest, one or two subjects to be given from which a selection may be made, 14 per cent.; penmanship, 14 per cent.; accurately copying from plain printed copy in competitor's own handwriting, 14 per cent., and finally, the most important qualification, experience in the operation of telephones, 30 per cent., making a total of 100 per cent.

UNITED STATES TELEPHONE EARNINGS.

THE gross earnings of the United States Telephone Company for February were $27,888.37, says *Finance*. The expenses, including $700 of taxes, were $17,155.24, leaving net earnings $10,433.13. The fixed charges were $7,770.84, the interest on preferred coupons was $85.48 and on bills payable was $259.65, making a total of $8,115.97, leaving a surplus for stock of $2,317.16. Considering the fact that February is a short month and that the expenses were unusually heavy on account of sleet storms, the statement is a very satisfactory one. Early returns on the March earnings indicate that the company will show a gain over February of at least $6,000 gross and at least $3,000 net, which will make the surplus for stock in the neighborhood of $6,000, or at the rate of $72,000 for the year, or nearly 4 per cent. on the common stock outstanding.

FINANCING CUYAHOGA TELEPHONE COMPANY.

THE directors of the Cuyahoga Telephone Company, Cleveland, Ohio, met recently and formally approved a plan for refinancing the property, which in thirty days will be submitted to the stockholders for approval. The plan proposes the decrease of the present common stock of $3,000,000 to $1,500,000 by reducing the par value of the present 30,000 shares from $100 to $0 a share. It is then proposed to authorize the issuing of $2,000,000 6 per cent. cumulative preferred stock, of which $1,200,000 will be sold to the stockholders at $70 per share. In the event of their failure to take all of it, the balance will probably be taken by the Everett-Moore syndicate. The Federal Telephone Company will take enough of it to wipe out the Cuyahoga's debt to the Federal. The sale of this $1,200,000 will realize $840,000, of which $559,348 will go to pay the Federal Telephone Company debt and all other liabilities of the company, leaving a balance in the treasury of $270,662 for improvements. To reduce the capital stock a majority of all the stock is required and to authorize the new preferred issue a majority of the stockholders as individuals is required.

President Dickson figures that this plan will become operative and the money will be in the treasury of the Cuyahoga Telephone Company by July 1. He says if he is allowed to raise the rates to an equitable figure he will make the Cuyahoga Telephone Company one of the best telephone propositions, that the 6 per cent. cumulative stock will earn its dividend the first year and that the common stock will earn 3 per cent. the first year.

The Cuyahoga is making a much better showing of late as a result of the economies put in force by President Dickson, but it is absolutely necessary that the company be financed and the company's indebtedness be cleared up at an early date.

Under the new plan the securities of the Cuyahoga Telephone Company would be as follows:

Bonds—Authorized $3,500,000, issued $2,233,000.

Stock—Authorized 6 per cent. preferred, $2,000,000, issued $1,200,000. Authorized common, $1,500,000, all issued.

A NEW POLICE BOOTH.

MANAGER S. M. STRONG, of the Home Telephone Company, of Schenectady, N. Y., has been instructed by the Schenectady Board of Police Commissioners to install a police patrol telephone system, consisting of six booths, to be placed in various parts of the city for experimental purposes. If they prove satisfactory, the system will be extended throughout the city.

Ornamental iron booths will be erected at convenient corners containing a telephone connected with the Home exchange. The patrolmen and the public will have access to the booth, and all calls to police and fire headquarters will be free and promptly handled. The booth will also contain a pay station, which may be used the same as any other public telephone pay station. All money collected in this manner will be used by the police board in paying for telephone service. It is thought by the members of the board that in this way the service will be practically self-supporting.

In case the department or a citizen wishes to call a patrolman on beats where these booths are located, the booth is so equipped that a red light will be shown above the booth until the call is answered by the patrolman. This arrangement will be of great service to the department, as it is often desired to notify a patrolman who is on his beat of some matter of importance.

ROCHESTER STOCK A GOOD INVESTMENT.

NOTICE has been given that the dividend on the common stock of the Rochester Telephone Company, Rochester, N. Y., has been increased one per cent. per annum. Heretofore the stock has been paying four per cent. yearly, and it will now pay five per cent.

This certainly is a splendid showing for the Rochester company and for the dividend earning power of all Independent telephone companies. The Rochester company is one of the newest and also one of the largest Independent companies now in operation. It commenced business in May of 1901 on the principle the Bell has always declared impracticable in the telephone business—giving the best service at a low rate. It is now operating over 5,200 telephones, with rates of $48 for business telephones and $30 and $24 for residences. The capital stock, fully paid up, of the Rochester company is $590,000 and it has a bond issue of $400,000. The officers are Frederick Cook, president, and George R. Fuller, secretary and treasurer.

INDEPENDENT DEVELOPMENT IN CANADA.

THE current number of the *Canadian Engineer* furnishes a good illustration of Independent activity across the border. A few of the news items appearing in it show the following developments:

Ratepayers of Toronto Junction are dissatisfied with the Bell regime. They held a meeting recently at which a resolution was passed asking the Council to proceed with the establishment of a local telephone system.

An Independent system is to be established at Welland, Ont., connecting with the various rural lines around the town.

A new company has been organized, capitalized at $2,000,000, for which Messrs. Kidd & Thompson, of Ottawa, have applied for a charter to construct lines throughout Canada.

The Westport and Digby Independent lines are reported to have been sold to S. Gidney, of Mink Cove, N. S., who will entirely rebuild it. The Dominion Government will be asked to lay new cables between Petite and Grand Passages.

An unfortunate piece of intelligence contained in this number of the *Engineer* is that the new municipal system at Fort William has been destroyed by fire, but it is said it will at once be rebuilt.

A cable connecting the lower mainland with Vancouver Island will be laid by the New Westminster & Burrard Inlet Telephone Company.

The People's Telephone Company has given a contract for an equipment of 500 lines, which will be installed at once.

VICTORY IN SIGHT.

THE Legislative Assembly Committee on State Affairs of Wisconsin has decided by a vote of four to three to report for passage the telephone competition bill, which provides that any telephone company operating in various cities of the State shall maintain similar rates in similarly sized cities. The bill was introduced by Assemblyman Donald at the instance of Richard Valentine, president of the Wisconsin Telephone Association, and is designed to protect the Independent companies of the State against the unfair competition which the Bell or Wisconsin company employs.

TELEPHONES FOR HOME COMPANY.

THE Home Telephone Company, of Kansas City, Mo., has just placed an order for 6,500 telephones with the Stromberg-Carlson Telephone Manufacturing Company. The contract for supplying the complete exchange equipments for the various exchanges, building in Kansas City, Mo., and Kansas was awarded to the Stromberg-Carlson Company several weeks ago. The instruments ordered will be the very latest and improved design of the central energy type.

It is fully expected that as soon as the new plant is completed these 6,500 telephones will be at once placed in service and that within a year a total of 10,000 will be in service.

THE ENTERPRISING LONDON POLICE.

A CABLEGRAM from London, England, announces that the London police headquarters is now connected by telephone with the different police stations. American detectives visiting London have always expressed intense amazement that the London police made no use of the telephone. It is possible now, for the first time in history, for police headquarters to hear of a burglary or murder or any infraction of the law in a remote precinct on the same day it occurs.

Scotland Yard still continues in official ignorance of the telephone. It frowns down all suggestions that instruments be installed at the headquarters of the English detective system. Messenger boys—English ones, at that—are still swift enough for the London detectives.

NOW CHARGING FOR SERVICE.

THE Home Telephone Company of Utica, N. Y., is now charging for its service. The company has been in operation for over a month, but some detail work has just been finished and, therefore, the company didn't charge subscribers until the plant was in complete working order.

Under the terms of the company's franchise it could not charge for service until it had at least 1,200 subscribers connected, but this number has been had almost from the start. The company now has between 1,500 and 1,600 subscribers connected. It is connected with Clinton, Deansboro, Waterville and Oriskany Falls, and it expects to be soon connected with Rome on a new copper circuit. The service is improving every day. A new directory will be issued after May 1.

It is said that the Inter-Ocean Telephone Company, of Buffalo, is trying to put in operation another long-distance telephone system from Buffalo to Albany, including Syracuse, Utica, Auburn, Oswego and Rome. A line has already been established between Geneva and Buffalo.

The Editor's Page

WHY WE FIGHT THE DEVIL WITH FIRE.

ONE of our subscribers, who describes himself as a "Friend of True Telephone Development," finds fault with this paper's policy towards the Bell companies.

"You persist," writes this subscriber, "in attacking companies that are just as much a part of the telephone industry as the Independent companies. That which injures a Bell enterprise injures the whole cause of telephony. Why not adopt a broad policy? Why not work on both sides of the line, spreading the light on the art in general, giving the news of development and progress, and leaving the commercial aspect to take care of itself. It is small business and utterly unworthy of so fine a paper as yours to take sides in a fight for business between rival concerns. Let the Independents and the Bell have it out along any line they may see fit, and do you be neutral, fulfilling your true mission, which is not commercial, but technical. I am a great admirer of your paper. It is a beautiful specimen of the typographical art, standing in this respect at the head of the list of trade papers in the United States. It is perfect on the technical side, the only real telephone paper in the field. In fact, from every point of view, except one, it is a publication of which every telephonist may well be proud, and honors the art. It fulfills the true mission of the ideal trade paper, leading the industry, instead of following in the footsteps of progress. In heaven's name then, why not remove the one blemish? why not wipe out the narrow partisanship that makes fish of one set of companies and flesh of another? that makes every Bell concern a bedevilled institution and every Independent company a center of virtue and light? Be a *Telephone* paper! Let the commercial situation adjust itself."

By a singular coincidence the same mail that brought this letter brought also an answer; a better answer than any the editor of this paper could make. This other letter came from Colorado Springs, Colo., where a new Independent company is just starting into business. It is written by one of the officers of the new company to the editor of THE AMERICAN TELEPHONE JOURNAL and runs as follows:

> I am sending you a copy of the *Mining Investor* of April 13th, published in this city.
>
> On page 229, under the head of "Telephone Financing," appears an article indicating to the public that the ultimate outcome of all Independent telephone efforts is bound to be failure. The Colorado (Bell) Telephone Company is particularly strong in this territory, both from a political standpoint and from the fact that it has succeeded in selling to a large number of State residents securities, the sales being based on assurances against competition.
>
> The article mentioned is only one of many of the same kind and character made public by them. Of course, the article, embodying such rank misstatements, can ultimately be discredited, but their continued jumping from one situation to the other handicaps rebuttal statements to a great degree. If you can possibly find time to inform us briefly of the situation as it exists at any of these particular points, provided that you should have data covering same, we would consider it a very great favor.

The article alluded to by the writer of this letter is too long for reproduction in its entirety. As an introduction, it rehearses the usual stock arguments about "promoters who have goods to sell," "low rates thrown out as a bait to a deluded public," and so on down the line, the same old song that has been sung in type by the subsidized Bell papers since the appearance of opposition. Then the *Mining Investor* continues:

> This may sound like strong talk, but there are facts and figures to prove it.
>
> *Since January 1, 1903, no less than nine prominent opposition telephone companies have been taken over by receivers.* Below are appended the names of eight companies which should prove successful if opposition telephony can be made a success. The names and statements are taken from the Stock Exchange Hand Book of Cleveland, Ohio, which is in the heart of the opposition telephone district:
>
> The Federal Telephone Company, capital $10,000,000; incorporated 1899; no dividends have been paid.
>
> Citizens' Telephone Company of Fostoria; capital, $50,000; bonded indebtedness, $44,000; incorporated 1895; no dividends have been paid.
>
> Columbiana County Telephone Company; capital, $300,000; bonded indebtedness, $200,000; incorporated 1899; no dividends have been paid.

A "BROAD" TELEPH POLICY IMPOSSIBLE.

> Columbus Citizens' Telephone Company; capi
> 000; bonded indebtedness, $750,000; incorpora
> paid two dividends in 1901, at the rate of six per
> has suspended dividends since that time.
>
> Cuyahoga Telephone Company; capital, $3,000,0
> indebtedness, $2,223,000; incorporated 1898; no
> have ever been paid, and an endeavor is now bei
> issue preferred stock to prevent a defaultation on the bond inter
>
> Findlay Home Telephone Company; capital issued, $80,000;
> debtedness, $80,000; incorporated 1900; no dividends have been
>
> United States Telephone Company; capital, $2,000,000; bonde
> ness, $1,865,000; incorporated 1898; no dividends have been paid
>
> Youngstown Telephone Company; capital, $200,000; bonded in
> $125,000; incorporated 1896; no dividends have been paid.
>
> *Three of the largest Independent companies ever formed have*
> *wall, namely, Detroit, Richmond and Atlanta.*

The continued appearance of articles such as these supply the reason sought by our friend for THE AMERICAN TELEPHONE JOURNAL's attitude towards the Bell companies.

"Nine prominent opposition telephone companies have been taken over by receivers, *since January, 1903,*" declares this Colorado organ of the Bell. As a matter of fact, *not one opposition company* has been "taken over," the only "prominent telephone" company, opposition or otherwise, to fall into a receiver's hands since the first of the year being a Bell concern, the Michigan Telephone Company, which was capitalized at $5,000,000. The stock of this company has been entirely wiped out by the failure, which ruined thousands of poor investors, as the stock was held almost wholly by residents of Detroit and other Michigan towns.

The "eight companies" paraded by the *Mining Investor* as bugaboos to frighten away Colorado investors from the new Independent company could only be paraded in Colorado, or some other point far away from the center of Independent telephone development.

Every child almost in the middle west, and even in the east, knows that these companies were not "eight," but simply one, the Federal being the parent company that owned the other seven. And it is only strangers to the telephone situation who have to be told that the Federal got into trouble not because of intrinsic weakness, but because it was controlled by the Everett-Moore syndicate, which came to grief not through its telephone holdings, but through its electric railway operations. Even with this the Federal and its underlying companies has escaped the fate of the Michigan, for it has not at any time been in the hands of a receiver, and the various stocks are all in a fair way to be worth all they cost the holders.

The third specific statement of the *Mining Investor* is as misleading as the rest: "Three of the largest Independent companies ever formed have gone to the wall—Detroit, Richmond and Atlanta."

In the first place, these three companies were not among the "largest" ever formed; far from it. And while they "went to the wall" in a sense, it was the Bell companies with two of them who paid the shot and not their own stockholders—quite a comfortable difference. Both the Detroit Company and the Richmond Company were bought at a fancy price by the Bell companies operating in those towns in the vain hope of side-tracking competition. The Atlanta Company was built six or seven years ago, when Independent telephony was in its infancy. Its construction was experimental and naturally poor, so that it failed to pay dividends. But it is very much alive, nevertheless, having more subscribers than its Bell rival, and it is now in the hands of a company of practical telephone men who have plenty of money and experience, and who will make it one of the model telephone properties of the world.

This brief summary, pointing out the deliberate falsehoods set afloat by the *Mining Investor,* shows why it is necessary that THE AMERICAN TELEPHONE JOURNAL should battle for "True Telephone Development" along its present lines. When the Bell people cease to hire venal writers and blackmailing newspapers it will be time for us to consider a "broad policy."

RAILWAY TELEPHONY

APROPOS of recent railway casualties, a description of the telephonic method of communicating with moving trains, that has passed the purely experimental stage in Europe, is instructive. This system is installed upon the railway between Paris and Bordeaux and has been in active operation for some months with excellent success, if reports are to be relied on.

The circuits of the system are shown in Figs. 1 and 2. Fig. 1 shows the conductors placed along the track and the apparatus in the cab of the locomotive, while Fig. 2 shows the circuits extending to railway stations. The track rails are employed as one side of the line, while an insulated conductor, composed of a steel wire, about No. 4, B. & S., set upon insulators 6" above the ground, is used for the other half of the line. This steel wire is divided into sections, and at each station rises from the ground and passes aerially into the office, where the telephone instruments are established. The system accomplishes the following results:

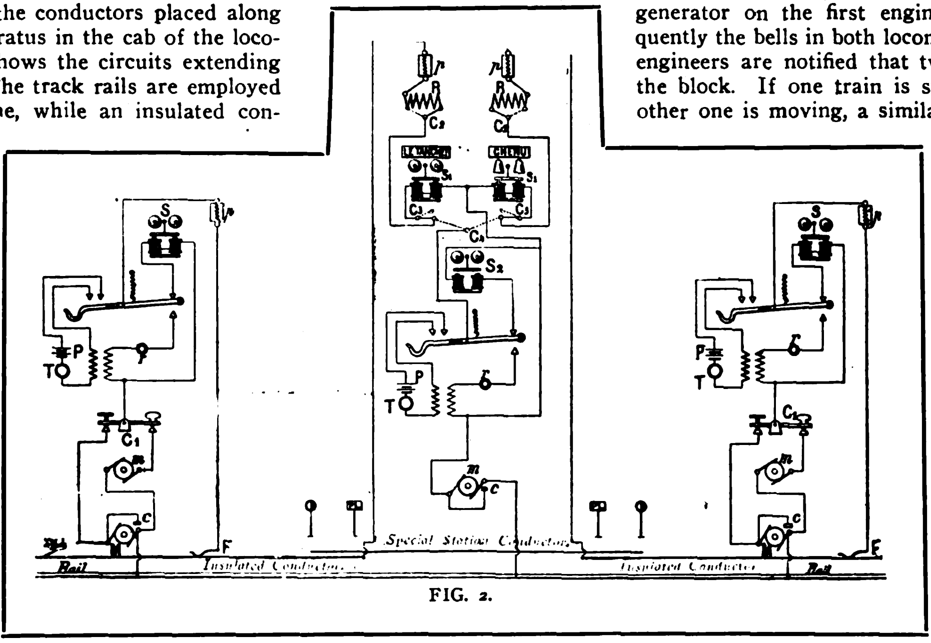


FIG. 2.

First — Automatic communication between two trains on the same block, whether in motion or at rest.

Second—Connection between any train and the nearest station.

Third—Communication between passengers in a train and the officers in case of necessity.

Fourth—An automatic warning to the engine driver of obstructions.

Fig. 1 shows the apparatus installed in the locomotive cab. M is a small magneto, which is geared to the wheels of the locomotive in such a manner that it is constantly in operation when the locomotive is running. This machine is furnished with an automatic centrifugal circuit breaker, c, and operates at a potential of about 40 volts; m is a hand dynamo, giving 100 volts. These machines are in circuit with a key, C^1, which is connected in the usual manner with the receiver hook, from which a circuit extends through the magneto bell, S, and the lightning arrester, r, to a metallic brush, F, that bears upon the insulated steel wire by the side of the track. As long as the locomotive is running the dynamo, M, is generating current, the circuit breaker, c, is open, and consequently current from this generator passes through the key, C^1, thence through the bell, S, lightning arrester, r, and the contact, F. Under these circumstances, so long as no other train is upon the block, the bell, S, remains silent. As soon as a second train enters the block its circuit, as shown in the left-hand side of Fig. 1, affords a path for the current from the generator on the first engine to ground, consequently the bells in both locomotives ring and both engineers are notified that two trains exist upon the block. If one train is standing still and the other one is moving, a similar state of affairs occurs, for the bells in both cabs ring. The respective engineers can either bring their trains to a standstill, or by removing the telephone from the switch hook and operating the hand generator, m, can call each other and talk.

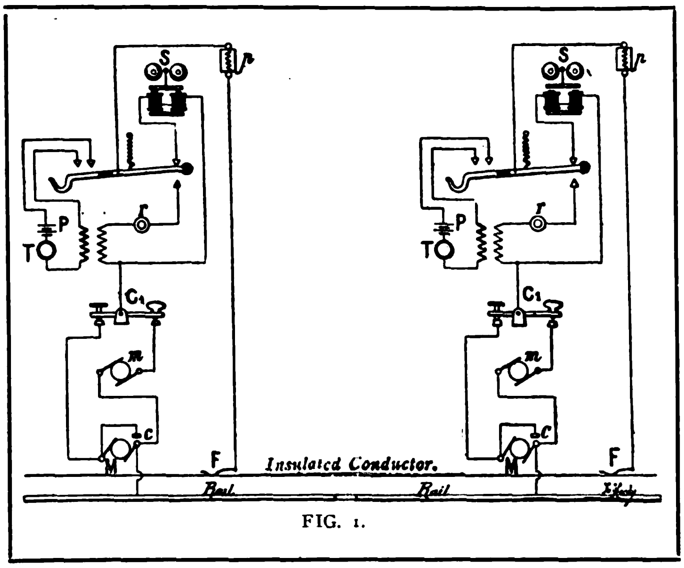


FIG. 1.

At every railway station the insulated conductor from the blocks in both directions rises from the ground, as is shown in Fig. 2, and passes through the telephone instruments located before the station master. The circuits, as shown in Fig. 2, are self-explanatory. The conductor from each block enters the station, passing through a lightning arrester, p, resistance, R, of about 4,000 ohms and a magneto bell. The 4,000 ohms resistance is so great that the 40-volt generator in the locomotive cabs cannot ring the signal bells, S^1, and consequently so long as trains are running on any block the station apparatus is silent; but in case either engineer wishes to call the station master, he has recourse to the hand generator, m; it is wound to give 100 volts and is thus sufficient to operate the station bell through the 4,000 ohms resistance.

The railway station is also supplied with a generator, m, whereby the station master can signal any locomotive within the adjacent blocks. Notice of line obstructions is given either by a track walker, who with any metallic substance such as a cross bar or piece of wire can short-circuit the insulated conductor, or automatically, as in the case of a flood, a fallen tree or a landslide, which would in a similar manner ground the insulated conductor under a mass of debris. It cannot be for a moment denied that the erection and maintenance of an insulated conductor carrying the sliding brush is a serious objection to such a system, but until wireless telephony shall have made very considerable advances some form of special conductor appears to be essential to the signalling of moving railway trains, and, however difficult and expensive the insulated conductor may be, it is a small price to pay to obviate New York Central tunnel horrors and Westfield catastrophes.

TELEPHONE A LIFE-SAVER.

JACOB FLEMING, of Fulton, Pa., owes his life to the fact that he has a telephone in his home. One evening recently he mistook some saltpeter for salts and swallowed a tablespoonful of the poison. Discovering his error after the harm was done, he hurried to his telephone and called up a druggist. He told the druggist of his plight, and asked what he should do to save his life. The druggist quickly gave directions. Fleming prepared the necessary antidotes, and although he is still in a weak condition, it is said he will recover.

CONTEMPORARY CROSS TALK

By "The Listening Key."

IN our last discussion on the telephone service, we found without much difficulty various good reasons why the average member of the public, patient and uncomplaining as he is, relatively speaking, in respect to the difficulties that arise in the conduct of other services, becomes most impatient and extremely ready to complain when the slightest hitch arises in the telephone service. The telephone subscriber, in short, is almost as sensitive as the telephone itself, and when his case is considered from his own point of view, as we have just considered it, the fact that he is so sensitive is seen to be perfectly natural. The directness and individuality of the use of the telephone, the fact that the subscriber is entirely alone with the instrument and is utterly helpless in the face of delay, inefficiency or impertinence on the part of the operator, or of delay or error caused by any failure of line or apparatus, the urgency of the communication and its general complete uselessness unless it is completed quickly and effectively, all tend to explain the exacting attitude of the subscriber toward the telephone service.

Thoroughly Efficient Service First

The very first concern of a telephone manager, therefore, should be to give his customers a thoroughly efficient service Theoretically, that is, of course, the object of all telephone companies, and probably there is no telephone concern in existence but would claim, through any of its representatives, that that object is thoroughly carried out. We all know, however, at least those of us who have moved about at all know, that telephone service differs very much in different places, and that neither the same methods nor the same standards obtain in every place that boasts of a telephone service. We are talking just now of what is commonly meant by the expression telephone service; that is, the exchange operating. To my mind, there is a good deal more that goes to make up a good service than the mere operating of the exchanges. But the operating of the exchanges is by all odds the most important point, and we will discuss that first; the others will no doubt come up for discussion in their turn. The operating of the exchanges is the most important point, both because by it does the customer judge of the telephone concern as a whole, and either praise or damn accordingly, and because the customer, from the very nature of the service, instinctively and insistently demands that it shall be good, and will put up with no half measures.

What is a Good Service?

Now, what constitutes a really good telephone service; that is, really good operating? We will assume that the plant is all right and is of such a nature throughout that when two lines are connected together the two subscribers can talk clearly and easily, for it goes without saying that good talking is the very first ingredient of good service. There was once a time, strange as it may seem now, when good talking was by no means the general rule; when, because the instrument, or the line, or something in the switchboard was out of order, one had to shout and bellow and strain one's ears and often, after furiously struggling, curse and give up in despair. But that time is past. Thanks to good construction and to first-class exchange and subscribers' station equipment, good talking is now the general rule, and poor talking quite the exception. It is safe to assume then that that difficulty in giving good service has, for all practical purposes, entirely disappeared, and that we have to concern ourselves only with the operating proper in discussing what makes up a good telephone service. The answer of many telephone men to our query, What constitutes a really good telephone service? would probably be simply—Rapidity. But speed alone is of little value.

Three Cardinal Points

There are really three cardinal points in operating a telephone service. The first is politeness; the second is accuracy, and the third is speed. After those come all the minor but very essential qualifications of knowledge of the system and the places it serves and interconnects with, the ability to deal with subscribers who express themselves badly and with pay-station users who express themselves wrongly, too freely, or not at all, and so forth. These qualifications only come with experience, anyhow, and the best operators, provided they are started right, are, of course, those of longest experience. Many telephone men would put speed as the first qualification of an operator, take accuracy for granted, and give politeness no thought at all. Therein they are entirely and grossly wrong. Politeness, and something even more than politeness, if it can be had, a most consistent, unruffled, good-natured courtesy, is of the very first importance in a telephone operator.

Why Politeness is First

The reason why one places politeness the first of the three cardinal points in telephone operating is that nowhere is the soft answer that turneth away wrath so effective—and often so needful—as over the telephone. As charity covers a multitude of sins in ordinary life, so does courtesy smooth away a multitude of difficulties and make up for many an error in telephone working. To be quick is useless unless one is at the same time accurate. The wrong number given quickly is far worse service than the right number given slowly. But an operator may even give the wrong number after undue delay and still not outrage the subscriber's feelings if she is only thoroughly courteous in expressing her regrets and in promising to make amends. But if she lose her temper over her own mistake and vent it on the subscriber, charging him with the mistake, or even failing to make any explanation or apology and going on with her work with short, snippy answers, then she makes an enemy for her company in that subscriber, who will give the company a bad reputation whenever the opportunity offers.

Lack of Politeness Irritates

It is perhaps putting forward an extreme view of the case to say that an operator may make up to a subscriber for combined delay and error by an attitude of perfect politeness, but it is quite true. What irritates a telephone user far more than delays or errors is lack of true politeness on the part of the operators, unintelligible replies, absence of explanation when difficulties occur, or shortness, "snippiness," or downright impertinence. As we have already pointed out, the telephone user is to a certain extent always in a state of nervous tension when at the telephone, and this feeling is at once increased when any difficulty arises. It causes an unconscious exaggeration or mistranslation of words and tones. An answer that would sound simply curt, perhaps even business-like, spoken face to face, sounds positively rude over the telephone, and tends enormously to irritate the sensitive feelings of the telephone user. The telephone user suffers from the additional disadvantage of being utterly helpless.

Secure Polite Operators

For all these reasons, politeness should be held to be the very first requisite of telephone operators. And it should not be a mere passive or negative politeness; that is, a mere abstention from being discourteous or impertinent. Downright rudeness or impertinence to a subscriber should be met in but one way—the prompt dismissal of the operator proven guilty. The politeness required of the telephone operator is of the active and unwavering sort; a politeness that manifests itself in the very tone of the voice, making "number, please" sound like a cheerful and courteous salutation, and tinging "So-and-So is busy" with a regretful note capable of dispelling any doubt as to the correctness of the report in the most unbelieving.

The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

EXPROPRIATING A RIGHT OF WAY.

THE Supreme Court of Louisiana has sustained a verdict and judgment obtained by the Southwestern Telephone Company against the Kansas City, Shreveport & Gulf Railway Company, expropriating a right of way for the telephone company's poles and wires on the east side of the railway company's right of way from the Sabine River to Shreveport and thence to the Arkansas line, and from De Quincey to Lake Charles. The total distance of 248 miles was assessed at $10 a mile. The court failed to sustain any of the three objections of the railway company to the judgment.

The first contention was that the telephone company had no right to expropriate the property in question because the law under which it proceeded (Act No. 124 of 1880 and Section 5 of Act No. 125 of 1880), authorizing the construction and maintenance of telephone lines "along and parallel to any railroads in the State," did not permit their construction upon such roads. To this the court said that the plaintiff did not propose to establish its line upon the railroad itself, but merely on the right of way.

The railroad company objected, secondly, that plaintiff's line would cause less inconvenience if built upon the west side instead of the east side of its tracks. There being already a telegraph line upon the west side, the court considered the difference of convenience hypothetical rather than real.

The third objection of the railroad company was to the insufficiency of the award, its claim being that the land was worth but fifty cents an acre. The cost of clearing it, however, was from $30 to $35 per acre, and, since the telephone company did not acquire absolute title to the land, had to protect itself from adjacent timber and keep its right of way clear from undergrowth, the court considered the amount allowed sufficient.

Southwestern Telephone Co. v. Kansas City, S. & G. Ry. Co., 33 S., 910.

FAILURE TO CONNECT WITH FIRE DEPARTMENT.

IN a suit by George H. and Statira H. Stone against the Southern Bell Telephone & Telegraph Company for damages because of the failure of the company to connect them with the fire department when their house was burning, the jury returned a verdict for the company. The house of the Stones in Thomasville, Ga., caught fire about two o'clock one morning, and they tried to call up the fire department, but it is alleged, to no avail. The contention of the company was that in a town of Thomasville's population, it was not expected to give continuous service at unreasonable times.

A FOUR-CORNERED FIGHT IN NEBRASKA.

A FIGHT that will be both complicated and important has been begun by the Fremont Telephone Company and the Hooper Telephone Company, two Independent companies —E. M. Tarbell, Elisha Remmele and W. J. Courtright—against the Nebraska Telephone Company, a Bell company, and the Farmers' Telephone Company, a former Independent concern now affiliated with the Bell. The Independents assert that the Nebraska company is attempting to secure a monopoly of the telephone business contrary to law and are proceeding under the laws of Nebraska relating to public service corporations on the theory that the Nebraska company cannot discriminate nor enforce a rule the sole purpose of which is to create and maintain a monopoly. The district court of Dodge county, Nebraska, has already granted a temporary injunction in the case.

The individual plaintiffs, stockholders and subscribers of the Farmers' company allege that that company agreed with the Nebraska company to put in Bell receivers and transmitters and requested them to exchange their Independent receivers and transmitters for the Bell instruments. This Tarbell and Remmele refused to do, and the Farmers' company cut their wires. They promptly spliced them and the company threatened to cut them again. They set forth that the only reason the Farmers' company agreed to make the change was because the Nebraska company asked it to and that the Nebraska company asked this solely for the purpose of maintaining a monopoly. They asked that the court declare void the contract between the two companies so far as it obligates the Farmers' company to exchange instruments; that they be restrained from cutting off the service of the plaintiffs and ordered to furnish service over all their lines without discrimination.

The Independent companies which are complainants allege an agreement made with the Farmers' company for mutual exchange of service and ask that the latter be commanded to establish connections on reasonable terms with the Fremont and Hooper companies and to furnish service on all its lines to its patrons. It is also requested that the Nebraska company be enjoined from dissolving its connection with the Farmers' company in case the latter should connect with the other systems. The scope of the injunction, if allowed as prayed for, will cover the fixing of toll rates and commissions and their apportionment between the companies, to be made by the court issuing the order. A final hearing will have to be had before the injunction can be granted or denied, the injunction already allowed being merely temporary.

DEATH CAUSED BY LINEMAN'S OWN NEGLIGENCE.

THE Supreme Court of New York expressed itself in the following vigorous language in deciding the recent case of Leach *v.* Central New York Telephone and Telegraph Company: "If the fact that the plaintiff is a widow, suffering under this distressing accident, were sufficient to establish a cause of action against this defendant, then this verdict might be sustained; but, inasmuch as it was necessary for her to show that such accident resulted from some negligent act or omission of the defendant, and without any contributory negligence on her husband's part, she has utterly failed to establish any claim whatever against it."

The suit was brought by Anna L. Leach as administratrix of the estate of Clarence E. Leach, deceased, for damages resulting from the latter's death. He was employed as a lineman of defendant in the village of Antwerp, where it was constructing a line. Most of the construction consisted in stringing its wires upon the poles of another company operating in the village. One pole was not safe and it was arranged by Leach, who was in charge of the work for defendant, and the manager of the other company that they would erect a new pole on the opposite side of the street from the unsafe one and then move all the wires thereon to the new pole. The unsafe pole stood on made ground and on a slanting bank from which the earth on the east side had been washed away nearly to the foot of the pole. It was supported by the wires strung upon it and by a guy wire. Climbing to the top of the pole, Leach cut this wire. The strain of the other wires was all towards the east, and as soon as the support of the guy wire was removed the pole fell over, throwing Leach off and killing him. The court held Leach's own negligence to be the cause of his death.

Leach v. Central New York Telephone and Telegraph Co., 80, N. Y. Supp., 1037.

SOME RESULTS WITH PUPIN COMPENSATING COILS

A FEW years ago telephonists were rejoiced at the announcement that Dr. M. I. Pupin had invented a method whereby the perturbing effect on voice currents in telephone lines could be ameliorated. Such an invention, it was promised, would enable economy in cost of conducting material to be made upon short lines, and render it possible to transmit speech over much greater distances than had previously been found successful. Subsequently the patents covering this system were acquired by the American Telephone & Telegraph Company, and with the customary reticence of that organization nothing further has bèen heard from the Pupin system. If it has been introduced in America, the work has been done so quietly that nobody has been sensibly aware of it, and certainly, so far as practical experience goes, talking between New York and Chicago is not much better than formerly. Theoretically the impedence coils of Dr. Pupin promise a marked relief, and in Germany Messrs. Simens & Halske have had the courage to put an installation in actual practical service, the results of which are of much interest to telephonists.

To demonstrate the operation of the compensating coils, the telephone cable laid between Berlin and Pottsdam, a distance of about twenty miles, was selected. This is a cable of the well-known paper type, simply buried in the earth outside of city limits, but extending through the conduit system in Berlin.

The cable consists of twenty-eight pairs of conductors each approximately, No. 18, B. & S. The resistance of the cable is 38 ohms, the capacity .06 m. f. and the inductance .0012 henrys per mile. The inductance coils were constructed to have a resistance of 4.1 ohms and an inductance of .062 henrys.

Sets of coils were located along the cable at distances of about 2,000 feet. The coils were arranged in a cast-iron box, somewhat similar to the old-fashioned distributing box.

The method of installing coils is shown in Fig. 1, from which it appears that the cable is carried through a sleeve somewhat resembling that of the Y splice to which the ends of the lead are soldered.

The cable conductors are then led into the box that contains the coils and fanned out in the usual manner. The whole apparatus is made waterproof by a cast-iron cover secured with a rubber gasket.

Fourteen pairs of the cable were selected for the test, seven of which were equipped with the compensating coils, while the remaining seven were used for comparison.

Comparative tests upon an equipped and unequipped pair, twenty miles in length, showed that conversation could be heard twenty times as far away from the receiver when connected to the equipped pair as when connected to the unequipped one. Experiments were then tried by connecting pairs together in series. When five successive pairs equipped with compensating coils were joined it was found that the transmission was about equal to that over a single pair unequipped with coils. Finally experiments were tried over thirteen pairs equipped with coils, giving nearly 250 miles of cable, and over this line conversation was clear and understandable, though faint. In a general way these experiments indicate that with the compensating coils conversation can readily be maintained over five times as much cable with equal facility as upon uncompensated lines.

The next set of experiments consisted in making similar trials upon aerial lines. The ordinary line insulator was replaced by a double insulator, shown in Fig. 2. The line upon which the trial was made extended from Berlin to Magdeburg and was composed of bronze wire of two sizes approximately, No. 9 and 12, B. & S. The No. 12 line was equipped with compensating coils, in order to favor as little as possible the operation of the compensating inductances. The length of the line was a little short of 100 miles. The results of the aerial tests were qualitatively about the same as those obtained when using the cable; that is to say, conversation over the loaded line could be carried on about five times as far, or, rather, was improved about five times over that transmitted by the unloaded line. A number of other interesting experiments were made sustaining the theory that it is necessary to introduce the compensating resistances at such intervals as to make the distance between them considerably shorter than the electrical wave lengths of the voice currents to be transmitted.

While Dr. Pupin was the first to put in practice the loaded line, the method, theoretically, is by no means a new one, for it was suggested by Heaviside more than a decade and a half ago, while at the World's Fair Congress Dr. S. P. Thompson gave a most interesting paper on the subject and pointed out methods of constructing ocean telephone cables.

Among the Independent companies there are many able and brilliant inventors, and there is no more promising field of investigation than that of the improvement of line transmission.

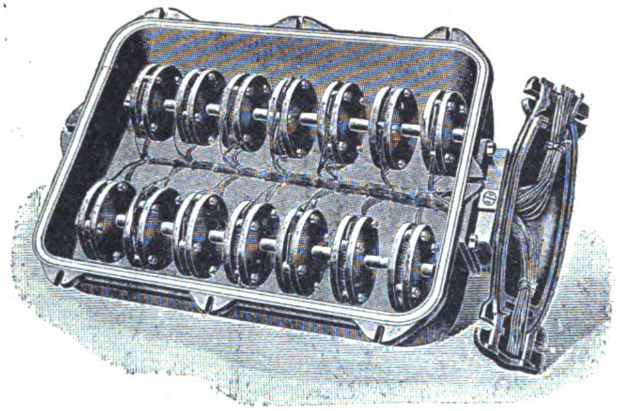


Fig. 1.

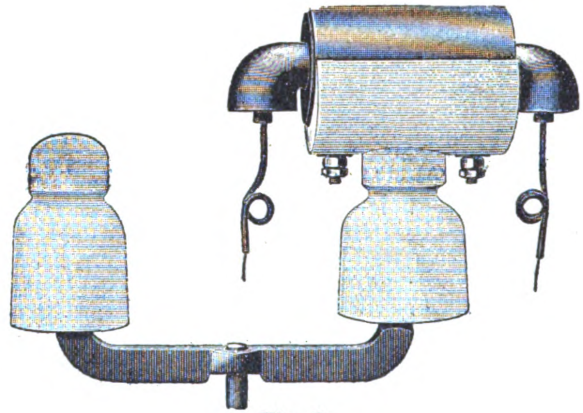


Fig. 2.

MARRYING BY TELEPHONE.

THE newest telephone wonder, according to the lay press, is a wedding performed over the wire at Nashville, Ind. The officiating clergyman was the Rev. C. P. Hanna, who lives about seven miles outside of Nashville. The contracting parties were George H. Barnhill and Mrs. Ida Metheny, both of Nashville. For some reason, not stated, the minister was not at the wedding in person, nor were any of the couple's friends. Instead, the latter were called to their telephones and informed that the ceremony was about to take place, and to listen carefully.

The novel wedding was then performed, the minister's deep bass tones and even the faint "Yes" of the bride being heard distinctly.

Although nothing was said in the newspaper stories of any drawbacks of the telephone in such a connection, it might be urged that there are two serious difficulties. One is that the bride's friends are deprived of the opportunity of taking notes of her gown and seeing her blushes, and the other that the compact is not sealed by the minister's kiss, which is a hardship to the latter, and probably would not be tolerated very often by a new bride's friends.

SIMPLIFIED CENTRAL OFFICE CIRCUIT.

Thomas Paul, of Yorkton, Canada, patents (No. 725,476), and assigns one-half to John L. McDougal, a telephone system. This invention relates to an improvement whereby the switchboard and central office appliances can be much simplified. It is illustrated in Figs. 1 and 2. Fig. 1 shows a sub-station connected to central office, while Fig. 2 shows two stations in the act of conversation. Each sub-station is provided with a line wire l^1; all these wires run to the central office and terminate at the hinge of the switch hook *I*. Consequently all the lines of the entire telephone system are tied together. The other line wire runs from the switch hook *S* to the central office, and thence terminates in a single spring jack. In addition, there is a common return wire *G* that extends throughout the entire system to every sub-station. When the subscriber wishes to call the office he rings in the usual manner, the ringing current passing over the common return *G*. When the operator answers she inserts a single plug *P*, which makes connection with the jack spring *M*. By this means it is claimed that great simplicity is secured.

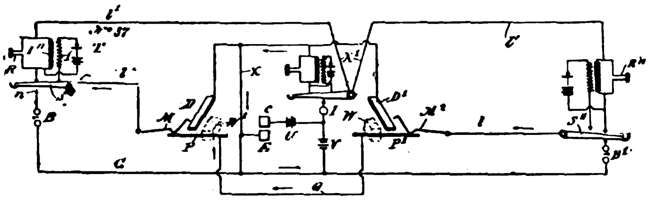


FIG. 1.

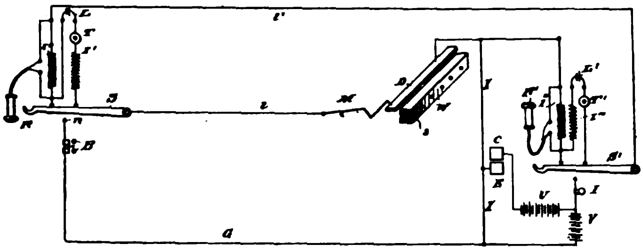


FIG. 2.

TELEPHONE-CALL REGISTER.

William Gray, of Hartford, Conn., patents (No. 725,244), and assigns to the Gray Telephone Pay-Station Company, a telephone-call register. This is a patent for an improvement in telephone-call registers to be placed at the subscriber's sub-station, and is shown in Figs. 3, 4 and 5.

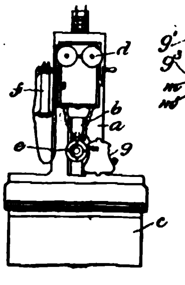


FIG. 3.

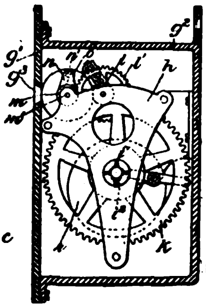


FIG. 4.

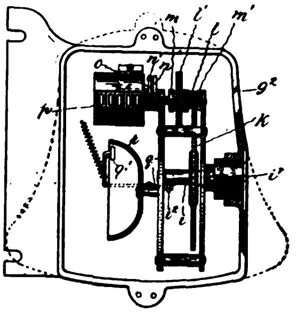
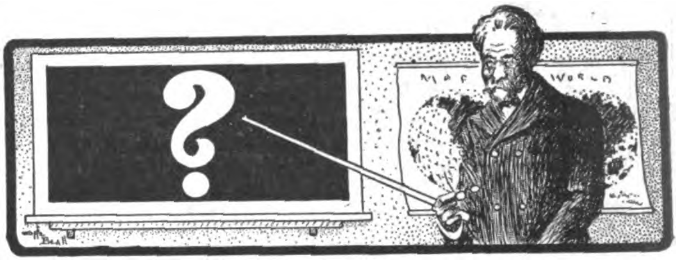


FIG. 5.

The inventor provides a clock-work mechanism, which is actuated by a crank that protrudes outside of the box that contains the register, to which the gong of the register with a cyclometer indicating device is attached. The operator is notified that the register has been operated by hearing a stroke upon the gong *Q*. In addition to this noise, the gearing of the register makes a sharp buzzing sound. This call register, therefore, gives a duplicate sound, a buzz and a ring, and the inventor claims that it is almost impossible to counterfeit this duplicate sound. Indications by means of a cyclometer register is also claimed to be an improvement in the way of cheapness and accuracv.



ANSWERS TO QUESTIONS

Conducted By WILLIAM W. DEAN

Queries on any subject relating to the technical side of telephony will be answered in this column.

SUBSCRIBERS' LINES.

On bridging lines, either metallic or grounded, should the wires that lead from the telephone (or the building in which the telephone is) go direct to the main line, or should they be tied to brackets or pins on the pole and then the short ends secured to the main line? T. F. C.

In Fig. 1 is shown what is considered the ideal method of running from a line into the subscriber's station. At first sight this method appears to be unnecessarily expensive, but it is well to remember that a large part of the line trouble is where the line jumps the pole into the house, so that money spent in clearing up this trouble would very soon pay for the extra expense of doing the work right in the first place..

CABLE SUBJECT TO VIBRATION.

We have a 100-pair No. 19 conductor, paper insulated, lead-encased cable, suspended under a wagon bridge. The messenger is secured to a girder every sixteen feet; the cable has been up about one and one-half years, and the vibration of the bridge has caused the casing of the cable to break in several places. Do you think that if we were to hang this cable from the messenger with a spiral spring that the spring would take up the vibration enough to eliminate any further trouble? We desire to leave the cable on the bridge if it is possible, inasmuch as it would cause us a good deal of expense to suspend it in the air, and even though we suspend it it will be a hard matter to make a span of less than a little over 500 feet long.

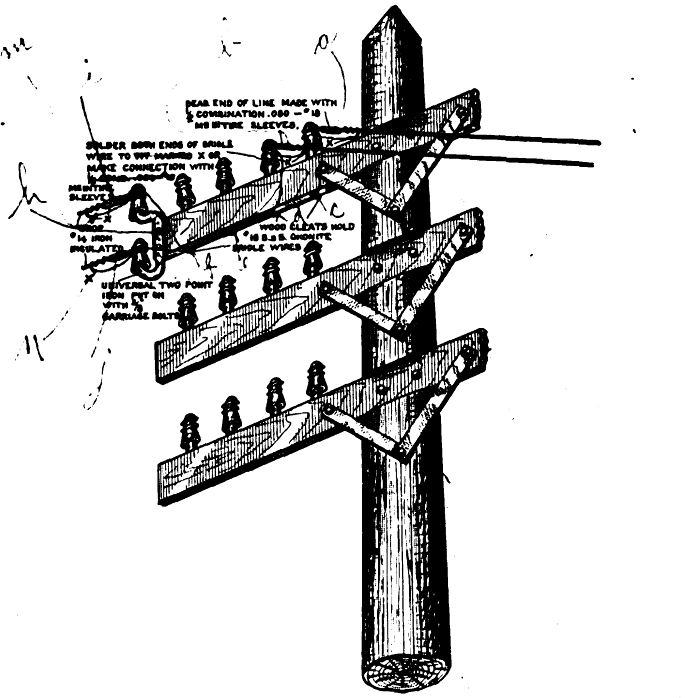

DEAD END OF LINE MADE WITH COMBINATION .080 — #18 MCINTIRE SLEEVES.
SOLDER BOTH ENDS OF BRIDLE WIRE TO WIRE MARKED X OR MAKE CONNECTION WITH
MCINTIRE SLEEVE
X
DROP #14 IRON INSULATED
WOOD CLEATS HOLD #18 B.&S. OKONITE BRIDLE WIRES
UNIVERSAL TWO POINT IRON FIT ON WITH ⅜ CARRIAGE BOLTS

FIG. 1.

It is customary, under the above conditions, to place the cable on the bridging in a wooden trough. In almost every case that I have known of where cables have been suspended under bridges, it is only a matter of time until the lead casing will break. The placing of springs between the suspension of the bridge structure only puts off the trouble a longer time.

The Week's Messages.

FINANCIAL

HILLSBORO, ILL.—The stockholders of the Mutual Telephone Company held a meeting here recently and voted to increase the stock of the company to $10,000 and to bond the property for $5,000. It was also decided to levy a special assessment of 50 cents per quarter on each subscriber, which is to be used as a sinking fund for the payment of the bonds. The company has contracts for about 130 additional telephones.

INDIANAPOLIS, IND.—The New Telephone Company has declared its regular 1¼ per cent. quarterly dividend.

SOUTH BOSTON, IND.—The People's Union Telephone Company, of South Boston, has increased its capital stock to $6,000. P. H. Diehl, president.

WASHTA, IOWA.—The Farmers' and Merchants' Telephone Company, of Washta, has increased its capital stock from $3,000 to $5,000.

COLLINSVILLE, MASS.—The Farmington Valley Telephone Company has voted to increase its capital stock from $18,000 to $27,000.

FALL RIVER, MASS.—The Fall River Automatic Telephone Company has declared a quarterly dividend of 1¼ per cent.

BAY CITY, MICH.—The directors of the Valley Telephone Company have declared the usual quarterly dividend. Connections have been established with Millington and Otisville during the past few weeks and plans for further extensions have been made.

RED LODGE, MONT.—The Montana & Wyoming Telephone Company has increased its capital stock from $40,000 to $100,000. The first project in view is the building of a line from Billings to Bozeman. A big deal is on for the absorption of three Wyoming companies. The deal, which will probably be completed soon, means the expenditure of about $20,000, but it will give the Montana and Wyoming company direct connection with the growing town of Sheridan, Wyo., by way of Buffalo, Wyo.

NEW YORK, N. Y.—Deputy Sheriff Plunkett has received an attachment against the International Telephone Company of America, of 15 Broad street, for $825 in favor of Darius O. Mills for rent of offices in the Mills Building for the quarter ended Feb. 1. The attachment was granted on the ground that it is a Delaware corporation. The sheriff went to the offices of the company to make a levy, but found no one there. This is the $200,000,000 company that alleged it was going to revolutionize the telephone business, furnishing service for 2 cents a message.

CLEVELAND, OHIO.—The deferred interest on the Cuyahoga Telephone bonds, due January 1, has been paid at the Dime Savings & Banking Company. On each coupon 35 cents on the deferred interest was paid. This payment clears up all the back interest due on any of the Everett-Moore telephone bonds and President Dickson says that neither the Cuyahoga nor the Federal will ever again have occasion to default on their bonds unless something very unexpected turns up.

CLEVELAND, OHIO.—The outstanding pool receipts of the Federal Telephone Company have been reduced to the extent of $150,000 par value as a result of the offer recently made to give bonds in exchange for pool receipts, providing the receipt holder would buy an extra bond at 85 for each pool receipt taken up.

BEDFORD, PA.—The Bedford County Telephone Company has increased its capital stock from $5,000 to $20,000 and will extend its service.

MOUNT MORRIS, PA.—The Mount Morris Telephone Exchange Company has increased its capital stock from $3,000 to $6,000.

WESTERLY, R. I.—The stockholders of the Automatic Telephone Company have voted to increase the capital stock to $20,000 to extend the lines to Ashaway and other points.

BEAUMONT, TEXAS.—The Beaumont Telephone Company has increased its capital stock from $120,0000 to $200,000.

GRANVILLE, VT.—The Granville Telephone Company has increased its capital stock from $30,000 to $50,000. Lines will be built to South Granville and Pawlet.

FRANCHISES

HOT SPRINGS, ARK.—The Southern Telephone and Telegraph Company has been granted a franchise, and active operations will commence forthwith. This company has gained a strong following, and the president, Harry H. Hale, is well satisfied with the outlook.

EUREKA, CAL.—W. E. E. Herron, a representative of the American Electric Telephone Company, of Chicago, has made application to the city council for a franchise for a new telephone service for the city and Humboldt county.

SAN PEDRO, CAL.—The board of trustees has granted a franchise to the Home Telephone and Telegraph Company.

EMINENCE, KY.—The city council has passed an ordinance offering to sell a twenty-year telephone franchise.

CRAWFORDSVILLE, IND.—The Crawfordsville Co-operative Telephone Company has presented a petition asking for a franchise to use the city streets for its system.

NEW ALBANY, IND.—Ed. V. Fitzpatrick, of Portland, Ind., has secured a franchise for a system in New Albany and guarantees to have the system in operation in six months. He will furnish the town officials with three telephones and allow fire alarm wires to be strung on the telephone poles. Rural lines will be put in as demanded.

VINCENNES, IND.—A franchise has been granted to McAndrew & Schroeder for the construction of a telephone system to extend through Widner, Vigo and Busseron townships.

SIOUX CITY, IOWA.—Attorney E. J. Stason has applied for a franchise here for the Fort Worth (Texas) Telephone Company, represented by J. A. Murray, of Fort Worth, who in turn represents Joseph L. Dunn & Co., of Wilkesbarre, Pa., the principal backers of the Fort Worth Independent Company. The Tri-State and Sioux City telephone companies have asked for franchises also.

GARDINER, ME.—The Northeastern Telephone Company, of Portland, has asked for a franchise here.

NEW BRUNSWICK, N. J.—The city council has passed an ordinance granting a franchise to the Central New Jersey Telephone Company to operate a system here.

HAMILTON, OHIO.—The Hamilton Home Telephone Company has been granted a franchise to construct a line to the county line.

LE RAYSVILLE, PA.—The borough council has granted franchises to the Rice Telephone Company, the Atwood Telephone Company and the People's Telephone Company.

COMBINATIONS.

MONTREAL, CANADA.—The controlling interest in the Merchants' Telephone Company, of Montreal, has been purchased for a United States syndicate by Arthur Johns, of New York. A. S. Hamelin, president of the company, is succeeded by Dr. J. N. Culbertson, of Buffalo, N. Y., who will also be general manager. Joseph Moisan has been elected treasurer, succeeding A. S. Delisle, who, with Mr. Hamelin, will remain with the company as members of the directorate.

GERMANTOWN, KY.—The Mason County Mutual Telephone Company is endeavoring to buy the Germantown and Maysville line or get permission to enter the town.

FAYETTE, MO.—The Fayette Telephone Company at the last meeting of its board of directors changed its name to the Howard County Telephone Company. It has bought the Glasgow exchange and a half interest in the Higbee exchange.

REPUBLICAN CITY, NEB.—The Farmers' and Merchants' Telephone Exchange has submitted a proposition to the stockholders of the local lines to purchase their property. It has been referred to a committee.

THE WEEK'S MESSAGES—Continued

MANSFIELD, PA.—At a meeting of Citizens' Mutual Telephone directors in Mainesburg recently it was voted to take into the company the recently completed line from that village by the way of Gray Valley to Ballard's Corners, the West Sullivan Creamery-Elk Run line and the Mansfield line to Roseville. It was decided also to accommodate the dozen or fifteen residents on the State road who desire telephone privileges by stringing an extra local line to Sylvania. A switch is to be established at once at Elk Run.

ERIN, TENN.—An arrangement has just been perfected by which the Houston County Telephone Company has consolidated with the Home Telephone Company, of Clarksville.

ELECTIONS.

MONTMORENCI, IND.—The Montmorenci Telephone Company has elected the following officers: Henry A. Miller, president; Robert J. Williamson, secretary, and H. Clarke Westfall, treasurer.

WATERLOO, IOWA.—The following officers have been elected for the Commonwealth Telephone Company, the concern which purchased the Cedar Valley Telephone Company and its affiliated lines: President, C. P. Bratnober; treasurer, F. J. Eighmey; board of directors, C. P. Bratnober, Judge F. C. Platt, C. O. Lamson and G. E. Lichty, of Waterloo; C. H. Rodenbach, of Cedar Falls; A. J. Wheeler, Jr., of Chicago, and J. B. Russel, of New York.

FALL RIVER, MASS.—At the annual meeting of the stockholders of the Fall River Automatic Telephone Company the following officers were re-elected for the ensuing year: President, John W. Coughlin; treasurer, Bradford D. Davol; directors, John W. Coughlin, Martin Feeney, P. A. Matthewson, R. J. Thompson, R. F. Haffenreffer, Jr., R. P. Borden, Michael Sweeney, B. D. Davol, of this city, and Vinton A. Sears, of Boston.

HANNIBAL, MO.—The stockholders of the Bluff City Telephone Company have elected the following directors: C. H. Brown, of Grinnell, Ia.; W. E. Keeler and J. C. McCord, of Mount Pleasant, Ia.; H. G. Conger, J. F. Davidson, J. P. Hinton and G. W. Whitecotton, of Hannibal.

WEST CHENANGO, N. Y.—At a meeting held here of the stockholders of the Mt. Ettrick Telephone Company three lines were represented, the Maine, Glen Aubrey and East Maine. Directors were elected for each line as follows: Maine—J. A. Riley, Walter Hogg, W. J. Bronk. Glen Aubrey—A. J. Greene, E. L. Greene, Frank Brigham. East Maine—James Carpenter, Roscoe Whitcomb. The following officers were elected: President, J. H. Riley; vice-president, James Carpenter; secretary, Will H. Johnson; treasurer, Frank Brigham.

DELTA, OHIO.—The Home Telephone Company has elected the following officers: President, C. R. P. Waltz; secretary and treasurer, G. A. Everett; manager, Jacob Pratt.

PAISLEY, ORE.—At the annual meeting of stockholders of the Lake County Telephone and Telegraph Company the following officers were elected: S. B. Chandler, president; F. M. Chrisman, vice-president; George Conn, superintendent; directors, S. B. Chandler, W. P. Hevyford, George Conn, F. M. Chrisman and William Harvey. The company installed an exchange at Lakeview last December, with about thirty subscribers, at a cost of $1,000. It is now doing a flourishing business.

BOLIVAR, PA.—John P. Herrick, of the Bolivar *Breeze*, has been elected president of the Bolivar Telephone Company.

MIDDLEBURY, VT.—At the annual meeting of the Addison County Telephone Company, held in its office in Middlebury, the following officers were elected: President, John A. James, Weybridge; vice-president, J. S. Dodge, Warren; treasurer and secretary, A. T. Calhoun; auditors, John A. James and J. H. Stewart; board of directors, Allen Calhoun, John H. Stewart, F. M. Moulton, of Vergennes; John A. James and A. T. Calhoun. The company is in a flourishing condition and will make large extensions the coming summer.

UNDERGROUND

DES MOINES, IOWA.—The city council has passed an ordinance compelling all telephone and telegraph wires in a prescribed district to be placed underground. The Iowa (Bell) Telephone Company officials say they will at once comply with the ordinance, spending about $200,000 in this and other work.

DULUTH, MINN.—Application has been made by the Duluth Telephone Company for a permit to put its wires underground.

DULUTH, MINN.—It is understood that the Zenith City Telephone Company will soon file a permit to lay a conduit system in the downtown streets for its wires.

ST. PAUL, MINN.—The Twin City and Northwestern telephone companies may have to place many of their wires underground because of the additional paving of streets.

SENECA FALLS, N. Y.—The village trustees are considering the advisability of ordering the various telephone, telegraph and other electric wires, now strung on poles in the main business streets, placed underground.

NORRISTOWN, PA.—The Montgomery Subway Company has been granted a franchise to construct an underground system of conduits here, to be leased to telephone and other electrical companies.

PERSONAL

PITTSTON, PA.—Herbert C. Peterson, formerly manager of the Pittston exchange of the Pennsylvania Telephone Company, has resigned, to take charge of the work of putting a telephone system along the lines of the Chesapeake & Ohio Railroad in West Virginia. He will have his headquarters at either Hinton or Huntington, W. Va.

New Construction in the Field

NOGALES, ARIZ.—F. E. Monteverde has secured the telephone concession for the city of Hermosillo and is in Nogales to arrange with Roy & Titcomb to install for him a complete telephonic plant in the capital city.

NEW WESTMINSTER, B. C., CANADA.—The New Westminster and Burrard Inlet Telephone Company will lay a cable connecting the lower mainland with Vancouver Island.

WILMINGTON, DEL.—It is said that the Delaware Long-Distance Telephone Company and the Maryland Telephone Company, of Baltimore, will build a trunk line the entire distance of the State, to connect with the Delmarvia system on this end and to take in the Eastern Shore counties of Maryland, which will probably pass through Newark, Glasgow, Summit Bridge, Middletown, Smyrna and many other towns.

LAKELAND, FLA.—The Peninsular Telephone Company has leased a large, new brick building at Lakeland, which will be used for the equipment for the Lakeland exchange. It will consist of a new and enlarged switchboard to accommodate the increasing business at Lakeland.

McRAE, GA.—Mr. Horton and other interested parties are considering the advisability of establishing a telephone line from McRae to Jacksonville and China Hill. Then the next line will be run to Milan and Rhine, connecting with Abbeville from the latter place.

TAHLEQUAH, I. T.—The Cherokee Telephone Company is constructing a new long-distance line between here and Muskogee, via Melvia and Fort Gibson. This company proposes to build a long-distance system all over the Indian Territory.

LEAVENWORTH, KANS.—The People's Telephone Company will extend its line from Leavenworth to Kansas City, Mo., to connect with the Home Telephone Company, now building.

PONTIAC, ILL.—B. F. Hall, engineer of the Streator Independent Telephone Company, is here and will soon order material for constructing the local system.

STREATOR, ILL.—Albert Schuler, local manager of the Independent Telephone Company, is setting poles and stringing wires for the Grand Ridge exchange.

TEHERAN, ILL.—The Teheran Telephone Company is trying to get enough subscribers to extend its line to Mt. Olive.

BLUFFTON, IND.—The board of directors of the United Telephone Company decided to add a section to the Marion switchboard and to put in some new cables in this city.

DEER CREEK, IND.—A. A. Cook, president; C. V. McCluskey, vice-president, and Daniel McClusky, treasurer, of the Deer Creek Telephone Company, recently organized, have placed an order for 200 telephones.

LOGANSPORT, IND.—The Logansport Telephone Company will spend $60,000 the coming season in putting in toll lines. Exchanges will be established at Young America and several of the smaller towns.

PORTLAND, IND.—The United Telephone Company, which owns the

THE WEEK'S MESSAGES—Concluded.

Independent toll lines through this city, will spend $55,000 in rebuilding the exchange at Montpelier. Thirty-four thousand dollars worth of bonds have been sold by this company, $10,000 going to the Fort Wayne Trust Company and $24,000 to the Tri-State Association.

WABASH, IND.—A complete system of rural telephones will be built in the country around Wabash this spring by the Home Telephone Company, which already has applications for 200 to 300 telephones from farmers. In some of the towns switchboards will be installed.

CEDAR RAPIDS, IOWA.—The new building of the Cedar Rapids and Marion Telephone Company has been finished. The work of putting in the office fixtures and the new switchboard, which will take about six weeks, has been commenced.

DES MOINES, IOWA.—At a meeting of the board of library trustees it was agreed to direct Architect Smith to prepare plans and advertise for bids for equipping the new library building with a complete interior telephone system to connect all the departments with the office of the librarian on the second floor.

OGDEN, IOWA.—The Ogden Telephone Company is building its line to Pilot Mound.

LEE, ME.—The Lee Telephone Company has received a charter for a telephone line from Winn to Lee.

LEONARDTOWN, MD.—W. Bernard Duke, of Baltimore, has been on a trip through St. Mary county prospecting for a telephone line to connect with Baltimore.

PONTIAC, MICH.—The Oakland Telephone Company will soon be able to give connection with South Lyon and the southwestern part of the county. The Livingston company, of Howell, has been granted a franchise and will soon establish an exchange in South Lyon. It proposes to build on to Plymouth and to Detroit.

CANTON, MO.—The Lewis County Telephone Company is still at work improving and extending its lines. During the past three months more than sixty instruments have been installed on the farmers' lines and it is still receiving orders. The company has four lines between here and Monticello, the county seat, and it has connection with more than 1,000 farmers.

LA GRANGE, MO.—Henry Meirant, Conrad Bowers and several other farmers, of this place, will soon begin construction on a new telephone line from Sellers, Mo., to Quincy, Ill. The line will pass through La Grange, and its total length will be twenty miles.

ST. LOUIS, MO.—The Kinloch Telephone Company is building west from Jefferson City across the State to Kansas City. The Kinloch company has secured a franchise to connect at California, Mo., and is now securing franchises further west.

FALLS CITY, NEB.—The Falls City Telephone Company has several lines in the process of construction and several more are contemplated.

WADESBORO, N. C.—The Wadesboro Telephone Company will establish an exchange at Morven. The exchange will be connected with Wadesboro by a full metallic circuit.

HEMPSTEAD, N. Y.—The South Shore Telephone Company has placed new switchboards in its central office here.

NICHOLS, N. Y.—Dr. W. A. Moulton, of this place, and parties in Tioga will build a telephone line from Tioga Center to connect with the lines of the Home Telephone Company.

ONEONTA, N. Y.—The Oneonta Telephone Company and the Davis Telephone Company have entered into an agreement whereby each will at once construct a metallic line over the territory covered by them in this valley.

SARATOGA SPRINGS, N. Y.—The Saratoga Telephone and Telegraph Company will extend its lines to Greenwich.

WOLCOTT, N. Y.—The Wolcott Rural Telephone Company will soon construct a line to South Butler, Butler Center and Red Creek. The company will build other lines, taking in North Wolcott, Desbroughs Park, North Huron and probably Lake Bluff. These lines will be controlled by a stock company and will connect with the Wayne County Telephone Company at Wolcott. E. T. Phillips and A. L. Fish are in charge of construction.

BENTON RIDGE, OHIO.—A meeting of the Home Telephone Company was held recently, at which the president, manager and principal officers of the company met the farmers of the vicinity relative to a proposition to extend their lines more generally over the country.

CLEVELAND, OHIO.—Plans are under way for giving the United States Telephone Company $200,000 in cash by the 1st of July for the vigorous prosecution of extensions and improvements and for the payment of its small floating debt.

CLEVELAND, OHIO.—The Lake Shore Railroad is preparing to construct a private telephone system to connect the division terminals and at each terminal to have an exchange to connect the various offices at that terminal.

GALLIPOLIS, OHIO.—The Gallipolis Telephone Company has connected its Vinton lines with Rio Grande, Thurman, Alice, Ewington, Danville, Dexter, Keystone, Wilkesville and Rutland.

THOMPSON, OHIO.—The Thompson Telephone Company already has sixty telephones. Alten Dewey is president; Dr. W. P. Ellis, vice-president; E. T. Stevens, secretary.

CALIFORNIA, PA.—Citizens of California are arranging to establish an Independent telephone line with the central station at California and to connect with Coal Center, Wilna, Phillipsburg, Smallwood, Centerville and Marchand. Ordinances have already been introduced in the borough councils at California and Coal Center, which are to be connected with a fifty-wire cable. Contracts for 200 telephones have been secured in the two towns. The rate will be $1 a month for residence and $1.50 a month for business.

OAK GROVE, PA.—The Commercial Telephone Company is rushing work on its lines in connection with the new central office at this point.

UNIONTOWN, PA.—Uniontown is now connected with the southern end of Fayette county by five telephone trunk lines of the Tri-State Telephone Company. Two of these are new lines and the other three have been thoroughly repaired. The new switchboard at Uniontown will accommodate 400 subscribers at the start. Additions can be made at any time without interfering with the service. A new office and new switchboard have been put in at Scottdale. Dunbar will also have an additional operator.

CHARLESTON, S. C.—The Gordon Telephone Company has connected its long-distance lines with Adams Run.

MORGANTOWN, W. VA.—The People's Teelphone Company has increased its capital stock by $5,000, which will be used in increasing the number of subscribers to 750.

TRADE NOTES

The Faller Automatic Telephone Exchange Company has leased a handsome new factory building at 772-776 Twelfth avenue, New York. The building is six floors in height, with ample light on all sides and will accommodate about 1,000 hands. The Faller Company has taken it on a ten-year lease, with an option to purchase.

The Central Electric Company, Chicago, states that it has received more orders this spring for Stombaugh guy anchors than ever before. The company attributes this to the fact that the Stombaugh is easier to install, is cheaper, will stand a greater strain and will give better satisfaction in general than any other guy anchor on the market. A descriptive pamphlet will be sent on application.

Index de la Presse Technique, or, translated, **The Index of the Technical Press**, is the title of a new publication, the first number of which appeared in April. It is published in Brussels, and its object is the systematic indexing of articles of general interest appearing in the principal trade and technical papers of the world. The title of the article with a brief explanation is given, the name of the author, the origin, the date of publication and the approximate length of the article. English, French and German publications will be indexed in their respective languages and other nationalities in French.

The Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y., and Chicago, Ill., reports it has begun the erection of a second factory in Rochester, which will be engaged in the manufacture of telephones. The plans call for a factory having 200,000 feet of floor space and capable of turning out 2,000 telephones per day. The company also reports having just secured the contract from the Home Telephone Company, Kansas City, Mo., for 6,500 central energy telephones. Other contracts which it has secured are a 1,000-line switchboard, 325 bridging telephones, 150 series telephones and 2,200 pounds B. B. wire for the Patrons' Telephone Company, Orrick, Mo.; complete exchange equipment for F. M. Stamper, who is constructing an exchange at Troy, Mo., through its representative, H. B. Hewitt; 100-line switchboard for the Harrison Telephone Company at Gilman City, Mo., and switchboards and equipment for the following companies: Local Telephone Company, Crestline, Ohio; Harrisonville Telephone Company, Harrisonville, Ohio, and Foster & Faber, Summerfield, Ohio.

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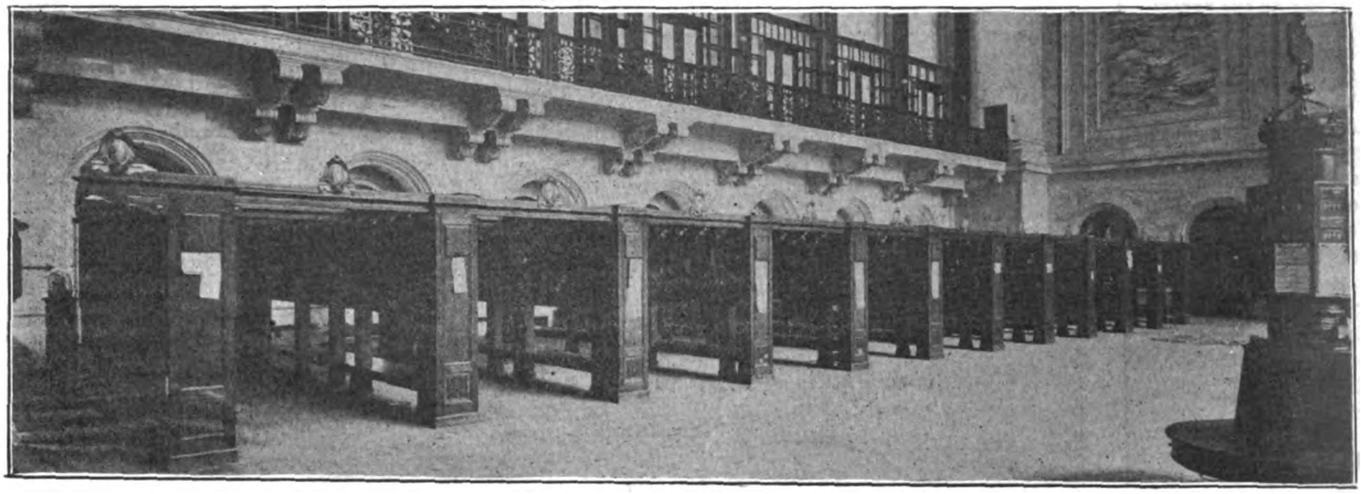
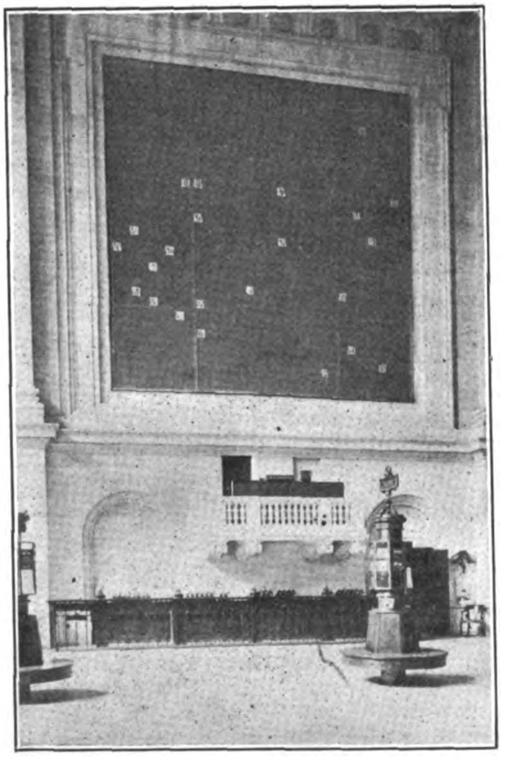
THE TELEPHONE BOOTHS—FIG. 1.



THE LARGEST PRIVATE TELEPHONE SYSTEM IN THE WORLD, IN THE NEW YORK STOCK EXCHANGE

By Earl F. Edmunds.

A TELEPHONE man's first impression upon entering the new building of the New York Stock Exchange, just finished, is that the telephone is the stock exchange. And he would be right, for there could be no stock exchange if they didn't have the telephone. It would be impossible to do business without it. The telephones occupy fully one-third of the entire floor space, space which is worth millions of dollars—and not content with the floor space, the adjuncts occupy two of the immense walls. It may truly be said that the telephone system installed in this great money market is the most wonderful in the world. The photographs with this article show how the system looks and will assist in explaining its operation. Fig. 1 is a general view of the stalls or booths in which there are placed 588 telephones, each one on a private line. Fig. 2 shows the call board or electric annunciator, and Fig. 3 is a detailed view of a section of the booths showing the telephone sets.

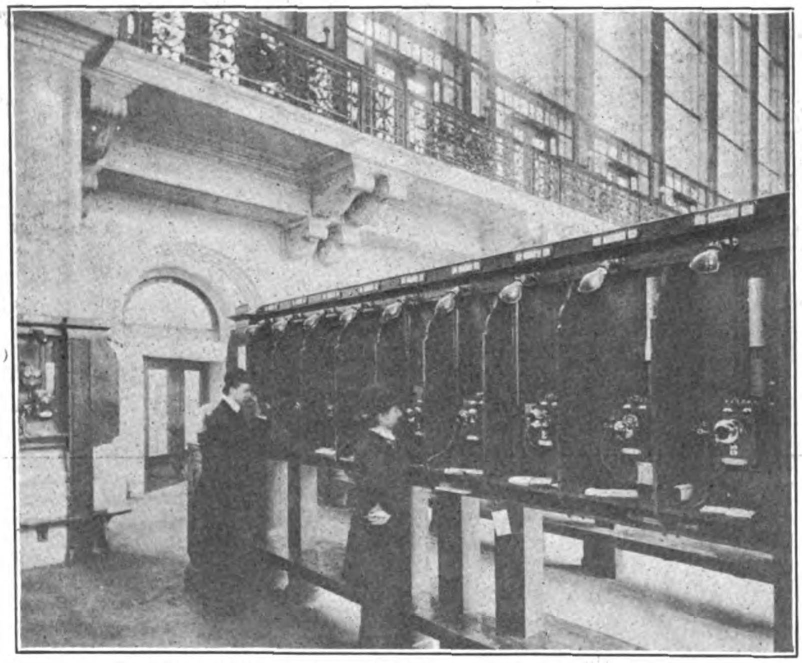


CALL BOARD AND GALLERY—FIG. 2.

Each firm owning a seat in the New York Stock Exchange has a telephone which is installed in one of the booths. In the booth there are two shelves, one for writing and the other to hold a subscribers' list, writing pads, etc. Beside the telephone set are two push buttons. The telephone sets were made especially to order for this installation, and consist of a hard rubber containing box, receiver, transmitter, ringer, and a button which takes the place of a magneto generator crank, for signalling. There is also a small drop, manually restoring, which falls when a call comes to the telephone, so that the attendant may know which bell is ringing. This is absolutely necessary when hundreds of bells all in close proximity are ringing simultaneously. The telephones are numbered from 1 to 588, each broker being known by the number of his telephone. Numbers corresponding to those of their telephones can be made to appear on the large annunciator or call board shown in Fig. 2 by pressing the button beside the telephone. At each telephone is an attendant employed by the broker. He receives orders from the broker's office to buy or sell. Of course they are in a rush, as a minute of time may mean a million dollars. Instead of running all over the floor of the room to tell the broker, the attendant presses the button that displays the broker's number on the big call board. In a second the broker is at the telephone, where he is handed a slip by the attendant telling him what to do.

In addition to these instruments, there is installed an intercommunicating system of DeVeau telephones. There are several of these, one at the pneumatic tube system of the telegraph companies, one at each entrance to the floor and in the gallery shown in Fig. 2. In this gallery is a bank of buttons, which, like the buttons in the telephone booths, may be used for throwing the drops of the large call boards. But the operator in charge here, by pressing the various buttons, may also cause to appear on the face of the numbers vari-colored discs, green, red, blue, etc. These discs mean that the broker whose number appears is wanted at a certain place—it may be at the Wall street entrance, the New street entrance, the telegraph pneumatic tube system, etc. The intercommunicating telephone installation is used for telling the operator in the gallery to call the brokers. A telegram may come for a broker, for instance. The fact is telephoned from the pneumatic tube station to the gallery operator, and he presses a button throwing the broker's number, on which also appears the color spot designating that the broker is wanted at the pneumatic tube station. As soon as the broker answers a call from the call board, the gallery operator or telephone attendant causes the disappearance of his number by pressing a companion push to the throwing button. The board is then ready for the next call. Both of the call boards are wired in unison, so that the pressing of a button causes the same signal to be displayed on both boards. The brokers in this way can easily keep their eye on the board, no matter in what position they are standing.

The peculiar thing about the main telephone system is that there is no central office or exchange. Each telephone is on a private individual wire running directly to the broker's office, which may be a mile away. For outside communication there are thirteen telephones placed in the main entrance hall on the Wall street side of the building. Here also are four telephones connected with the long distance exchange. The thirteen telephones go to the Broad Street Exchange of the New York Telephone Company.



DETAIL VIEW OF TELEPHONES IN STALLS—FIG. 3.

All the private lines from the various brokers' offices are brought into the Stock Exchange to a room in the basement. This room contains the entire working plant and also a wire chief's desk for testing for trouble on any of the lines. In this room there is a ringing generator for supplying alternating current for signalling, a storage battery, with its charging plant, and the necessary connecting frames, which in a general way perform the functions of a cross-connecting board in a telephone exchange. The call boards are the largest ever installed, each one being 28 feet square. They are divided into nine sections by bronze dividing frames. Each call-board is composed of 1,200 drops or indicators, which are nine inches square. A shield half the size of one of these squares hangs on a horizontal pivot. The numbers are painted half on the swinging shield and half on the stationary portion of the board in such a way that when the shields are down the numbers are concealed, and when up the numbers are exposed. The shields are weighted so that if started either up or down they will continue in that direction until they assume a vertical position. They are actuated by current which can be made to pass at will through either of two electro-magnets, between which an armature is pivoted centrally. By pressing a push button a circuit is completed and current is allowed to flow through an electro-magnet, causing it to attract the armature, which, through the agency of a lever, imparts motion to the shield, thus raising it and displaying the number. When the companion push button is pressed, current will flow through the other magnet and impart an opposite motion to the shield, which will fall and conceal the number. The small colored shields which are used to denote different push button stations are operated in practically the same manner. Separate smaller electro-magnets are used for the color shields. Pressing a push button corresponding to a certain color will cause the color shield to raise, carrying with it the number shield; thus the number shield is displayed with a rectangle of color on its face. Pressing the same button used for causing the number to disappear closes both the shield and the color disc when the combination is displayed. A current of 10 volts, furnished by a Holtzer-Cabot motor generator, is used for magnetizing the electro-magnets for throwing the drops. There is also a duplicate generator and a gravity battery in case of a break down.

CONTEMPORARY CROSS TALK

By "The Listening Key."

THE importance of politeness on the part of telephone operators cannot be too strongly insisted on, and the standard to bet set, if possible, is not that of a mere passive civility, but a cheerful and engaging cordiality of voice and manner that will make the subscriber feel that the operator is really interested in her work and is trying to do her best for him on all occasions. We all know the weary operator, who answers in a tired and muffled voice, as if to intimate that you are an awful bore to bother her with your silly calls, and we know the curt and short-spoken operator, who snaps you up before you have fairly said your say; we also know the pert and inattentive operator, who has a more or less impertinent answer for any remonstrance. But although these three varieties of operator come within the experience of any telephone user, all telephone users also know well the brisk and cheery tones of the really smart and intelligent girl whose heart is in her work and whose very voice rings efficiency. This sort of girl can hardly be said to be in the majority, for the habitual telephone user recognizes her work as quickly as if he were watching her in person, and he never fails to appreciate it and comment on it. Such comment is not what one hears from telephone subscribers about the generality of operators who serve their lines, and the fact that it is freely and generously made when it is justified shows what sort of operator the telephone manager ought to cultivate.

The Importance of Accuracy

The importance of accuracy is second only to that of politeness. It is axiomatic that it is better to do the right thing slowly than the wrong thing quickly. If a man asks for 985 he would rather get 985 in thirty seconds than 989 in fifteen. Accuracy in telephone working is the more to be striven for by reason of the annoying results of errors and of the practical impossibility of checking errors and bringing home the responsibility to the perpetrator. If an operator gives a wrong number she annoys two subscribers—the one whose call suffers delay and the one who is called to the telephone by mistake—therefore she makes on two customers an impression of inefficient service. Moreover, a single error may forge a link in an endless chain of trouble, annoyance and loss affecting one or both of the two subscribers victimized. The calling line, due to the error, is made "busy" longer than it would have been had the call gone through correctly, and may so block an important call that otherwise would have been effective; or the line wanted originally may be taken up just at the time that the calling subscriber is struggling to get free from the wrong connection, and then he feels that insult is added to injury, when, after having got a wrong connection, he is told "busy" for the number he originally demanded. Then, the line called wrongly is made "busy" for a brief period when it should not be busy, and a call for it that should have been effective may be blocked or lost.

A Game of Tag

The working of a telephone system during the business day is an incessant game of tag, everybody continually striving to get in touch with everybody else, and here certainly time is golden and seconds are jewels of price. A single error, tying up two lines wrongly for but thirty or forty seconds, long enough for the mistake to be revealed and the lines to be disconnected, directly affects three lines and often four, and may indirectly affect innumerable others. In the rush of modern business forty seconds of lost time may easily cause some one in the endless chain, in the general game of tag, as many thousand dollars. Hence the importance of accuracy. And accuracy must be instilled into the telephone operator as a creed or a principle guiding all her actions. It is well known that telephone subscribers will rarely take the trouble to make prompt and specific complaints of minor errors in operating, no matter how annoyed they may be at the moment. Often they simply cannot spare the time necessary to do so. Often, though they go away from the telephone red-hot with indignation, and with the firm intention of making the liveliest complaint that can be put into dictatable English, they later cool down, think—"Oh, well, what's the good of getting the poor girl into trouble," and let the matter slide. Others, again, forget to make a complaint until it is too late to give particulars with certainty; and so it goes.

Not Always Protested

Consequently there is no doubt that many errors in telephone operating are not followed by protest from the victims, and are therefore not investigated by the manager. Nevertheless, the victims seldom hesitate to give the manager their opinions (uncomplimentary) when they meet him at the club or out at dinner. If he says: "Well, why don't you make specific complaints that we can investigate?" they generally reply: "My dear man, I don't want to make complaints; I haven't the time; and it's not my business to run your service for you, anyhow. Why don't you give us a good service that we won't have to complain about?" You explain that the subscribers' complaints largely help you to supervise your service, and you generally succeed only in convincing him that you don't half understand your own business, and don't pay half enough attention to training and supervising your operators. And he is not far wrong, either. It is unreasonable to expect subscribers promptly and specifically to report every little trouble they have with the service. Most of them are too busy to do so, and there is something sound in their contention that you ought to give them a service that does not give ground for complaint.

Complaints Must Be Prompt

Then we come to another point. A complaint, especially relating to an error in operating, is of little use unless it *is* prompt and specific. Errors in operating leave no trace, and an operator taxed with an error alleged to have been made the previous day will have the blankest memory as to anything that occurred so long ago. Even if the matter be reported within five minutes and the operator be immediately confronted with her crime, she will have extraordinary difficulty in remembering that anything out of the way has occurred. Human nature is very fallible, but human nature, especially feminine human nature, is rarely willing to admit it. The important thing to bear in mind is that there is no sure check on the work of the telephone operator; it leaves no tangible result, and makes no record, except in the case of toll connections. The work of the ordinary operator is in speaking, and in making and unmaking connections. The sounds she utters, be they right or wrong, vanish into the air and leave no trace. The work she does in putting up connections and taking them down has exactly the same appearance, as seen by the onlooker, whether it be all performed with scrupulous accuracy or tinctured by a liberal proportion of errors. A very watchful supervision would probably detect consistently careless work on the part of an operator, but the supervisor would have to be very watchful and the operator very careless. Broadly speaking, the operator is alone with her subscribers; of what she says there is no record and of what she does there remains no permanent trace.

Operator's Work Different

Obviously, the case of the telephone operator is very different from that of any operative doing work that has a tangible result which may be readily inspected. In this case the work is checked by the results. If mistakes are made they quickly show for themselves, and are brought home to the guilty party. However simple the work may be there is always an effective check on efficiency, and an error of any sort rarely escapes detection. In telephone operating, on the other hand, a great many errors necessarily escape detection, since a wrong connection has exactly the same appearance to a supervisor as a correct connection. For a supervisor to detect a wrong connection it would be necessary for her both to overhear and overlook the work of the operator, and such close supervision is not, of course, general practice. Therefore, the operators themselves must be accurate, must be thoroughly trained to realize the enormous importance of the most scrupulous accuracy. The telephone operator is dealing constantly with numbers, and mathematical accuracy should be instilled into her and exacted from her. Very often in dealing with certain classes of work it is considered that results are fairly accurate if they are within one per cent. of the estimate. But although one per cent. sounds like a very narrow margin, consider for a moment what one per cent. of error would mean, in gross results, in a large telephone system. Assuming that an operator handles a thousand calls a day, it would mean ten errors a day for each operator, and if there were, say, twenty thousand subscribers doing an average traffic of 11 or 12 calls daily, there would be a gross total of 2,200 or 2,400 errors each day. This simple little calculation gives some idea of the importance of extreme accuracy, for although a telephone manager might think off hand that he was doing pretty well if he had only one per cent. of errors, he could hardly contemplate with equanimity 2,400 errors a day.

DOCTORING SMALL-POX BY TELEPHONE.

SMALL-POX will now have no terrors for family physicians. The latest case on record of the use of the telephone in treating contagious diseases was in Lexington, Ky. The facts in the case are obtained from Mr. J. K. Johnston, manager of the Fayette Home Telephone Company of Lexington.

The small-pox victim was in the home of the Rev. D. O. Young. Mr. Young called up the Fayette Home Company, and asked that a telephone be installed in his residence. Mr. Johnston replied that he didn't care to take any chances with the dread disease by having his men install the telephone. Mr. Young then suggested that if the telephone company would run the wires to the outside of his house, and leave the telephone in the yard, he thought he could finish the inside wiring and install the instrument. This was done, and Mr. Young successfully installed the telephone.

Dr. Wheeler, who treated Mr. Young's family, did not care to subject himself to direct contact with the small-pox patient. He had a very large practice, and there would have been considerable worry to his other patients and annoyance to himself by visiting a home where there was small-pox. So, as soon as the telephone was installed, Mr. Young called up the physician, and, after telling him all the symptoms, the doctor prescribed for the patient. The medicine, which was ordered by telephone at the drug store, was left on the steps of Mr. Young's residence. The doctor was kept regularly informed as to the condition of the patient, his temperature, etc., and he gave all the necessary directions by telephone.

SOME STEPS IN THE EVOLUTION OF CIRCUIT DESIGN —ARTICLE XII—THE DEVELOPMENT OF THE CORD CIRCUIT

By J. C. Kelsey.

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THE development, so far, shows the cord circuit ending in two plugs, the answering and the calling exactly alike. But the calling end is equipped with a double key, which permits of ringing with one pair of contacts, and listening with the other. According to Fig. 82, the ringing key is so arranged as to cut off the circuit behind, so that ringing back in the waiting subscriber's ear is avoided. Another reason is that the half of the repeating coil and battery would short-circuit the generator current for single line ringing, and the ground at the battery would prevent party line ringing. The listening set is connected in bridge, so that the operator may talk to either answering or calling parties.

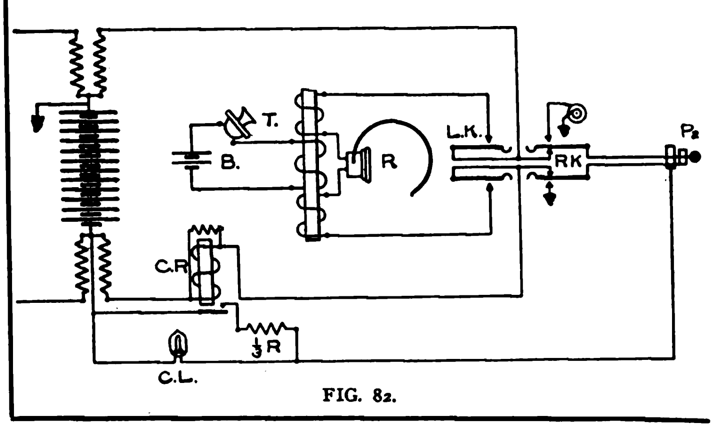

FIG. 82.

Fig. 82 shows a local battery operating set, which can be bridged on any pair of cords in the operator's position. The system is usually so large that there are many branch exchanges, that necessitate as many order wire connections, usually accomplished by a row of buttons, generally in strips of ten, at the right hand side of the keyboard. Depressing any one of the keys, puts the telephone set in direct connection with the "B" operator, at the receiving end of the order wire, belonging to that key. This is shown in Fig. 83 in which O^1K^1, O^2K^2, etc., are the order keys, placed in the operating set in connection with "B1," "B2," etc.

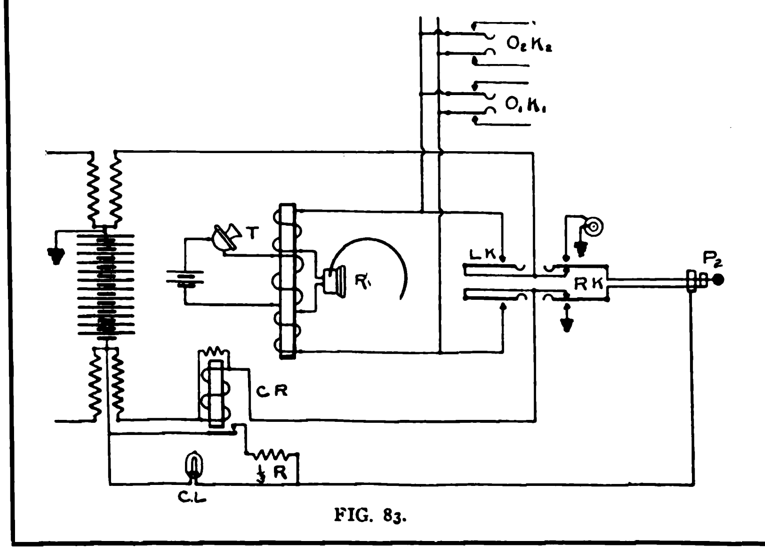

FIG. 83.

At night, the various "B" operators are not at their positions, from lack of business, and it is customary for an "A" operator, who wants a trunk call, to depress the order key of the exchange desired, and ring on the order wire. This operates a bridge drop at the "B" end of the order wire, and lights a lamp, which will cause the night bell to ring. This calls the night operator to the receiver, who takes the order. The key used for trunk ringing is shown in Fig. 84, as *RDK*, for the ring down key is so arranged that any one of the "A" operators may ring on any of the order wires without ringing back.

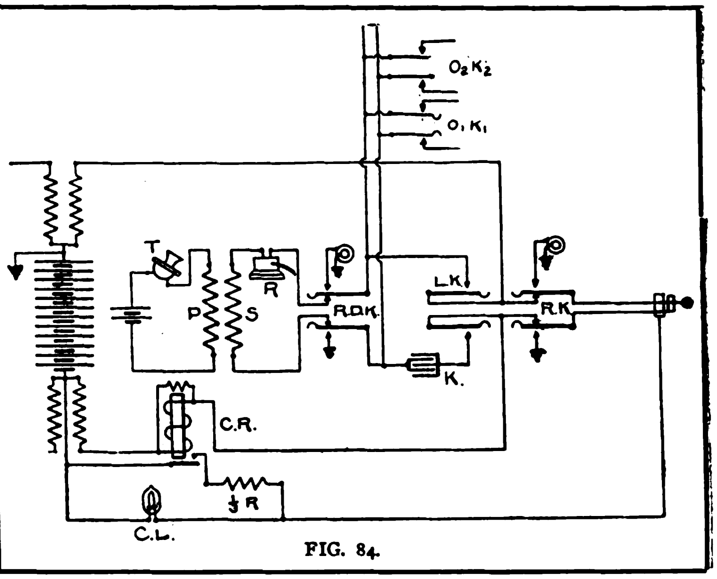

FIG. 84.

Looking at Fig. 82, it is seen that if the calling cord is plugged up, it lights the calling lamp, and the operator, throwing her listening set across the cord circuit, will put out the lamp as if the called party had answered, because the receiver and the secondary of the induction coil acts like a subscriber's instrument. This would cause a confusion of signals, which is remedied by the addition of a condenser, placed at *K* in Fig. 84. The condenser also saves the operator's ear from a click every time she throws in her listening key, because it prevents the sudden pull of a twenty-five volt battery on the receiver diaphragm, and does not in the least interfere with transmission.

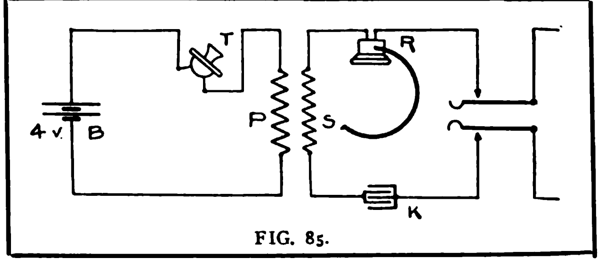

FIG. 85.

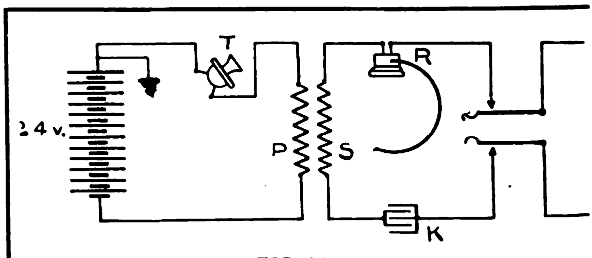

FIG. 86.

Fig. 85 is a local battery operator's set, with *T* as the transmitter, *B*, the four-volt local battery, *P*, *S*, and *R*, the primary, secondary, and receiver respectively. Suppose that it is desired to have all the transmitters on the common battery ranging from twenty to forty volts. Then, according to Fig. 86, the transmitter is placed in the primary circuit. But if one puts the re-

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Editor's Note.—The first article of this series appeared in the issue of November 29. They will continue many months.

ceiver to his ear, he will find something wrong, for there is a frying noise, and the transmitter will become very hot. This is due to the ability of the more powerful storage battery to force excessive current through the transmitter, and additional resistance must be added, sufficient to prevent the transmitter from heating or frying.

When several talking circuits are connected to the same bus bars, there is a likelihood of cross-talk. If every talking circuit was connected directly to a large storage battery, the cross-talk might be avoided, though there is still a probability of its presence. It is not practical to connect directly to the battery, for there must be suitable switchboards with apparatus provided for proper distribution. Therefore, to prevent cross-talk in the primary circuit, the resistance must be changed to inductive resistance, called retardation. This retardation guards against the entrance of stray electrical impulses, because all electrical impulses have an aversion to passing through coils with iron cores. It is in this manner that the repeating coil windings, around an iron core, guard the core circuit against the intrusion of impulses. This is shown in Fig. 87, in which *RET* is the retardation coil.

But a serious objection arises. We have deliberately inserted a coil with an iron core directly in the transmitter circuit. This will cut down voice currents, so that the transmitter is virtually useless. One can hardly hear hard tapping of the transmitter. Something must be done to overcome the retardation effect of this coil, so that the impulses generated by the transmitter will not be destroyed. This is accomplished by the ever useful condenser. It is connected in the primary circuit, so as to divide it equally, the transmitter and the primary in one-half, and the retardation and battery in the other half, as is shown in Fig. 88, where *K* is the condenser.

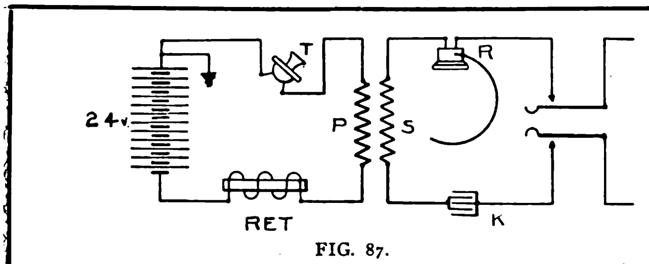


FIG. 87.

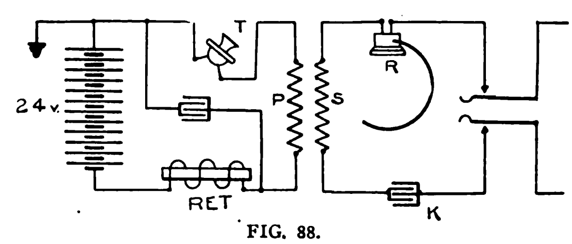


FIG. 88.

PLANS FOR FINANCING FEDERAL PROPERTIES

PRESIDENT F. S. DICKSON and associates of the Federal Telephone Company, of Cleveland, and the subsidiary companies, are rapidly getting the affairs of these companies into shape. They are now bending their energies toward putting the various companies on a sound financial footing. Much of the preliminary work of financing subsidiary companies has been done. Of the subsidiary companies, the Cuyahoga and United States are the ones now receiving most attention. The plan for financing the Cuyahoga Telephone Company was printed in THE AMERICAN TELEPHONE JOURNAL recently, and it will undoubtedly be put through. The United States Telephone Company requires about $200,000 for new work and improvements. The company during the next year will construct at least 350 miles of new pole lines and string about 20,000 miles of wire on pole lines already up. One plan for giving the United States the money needed is to increase the common stock to $2,500,000. A portion of this would be taken by the Federal Company in exchange for the claim which the Federal has against the United States Company. The United States Company is now earning in excess of 3 per cent. on $2,000,000 common stock outstanding.

Another plan which has been proposed is to make the increased capital stock of $500,000 a 6 per cent. preferred stock. Under this plan preferred stock would now be earning 12 per cent., and there would be no difficulty in paying 6 per cent. dividends. There is no doubt but that with the expenditure of the money needed the United States Company can easily earn 8 per cent. on its entire capitalization.

At the outset the indebtedness of the Federal Company was about $4,100,000. This has been reduced, however, to about $3,500,000, which was accomplished by the sale of the plants at Dayton, Ohio, and Jackson, Mich., and other small plants, which brought in about $200,000, and by settling with pool receipt stockholders, aggregating $150,000, which, with several minor settlements, cleared off about $300,000 of debts. This indebtedness of the Federal it is the earnest desire of the syndicate controlling the companies to clear up immediately.

James B. Hoge, secretary and treasurer of the Federal Company, is now attempting to settle with some of the creditors on the basis of the creditors taking securities in the shape of telephone bonds in the subsidiary companies at ninety cents on the dollar for their claims at par. The debts would be reduced in this way as far as possible. Then a new company to take over the entire remaining assets of the Federal at a given price would be organized. This proceeding would not only wipe out the Federal stock, but would wipe out the many unsecured claims. An attempt will be made, however, to effect a settlement on some basis with the unsecured creditors before this plan is entirely worked out.

Another plan which has been proposed and which is favored by many members of the syndicate is to settle with as many of the secured creditors as possible by giving them bonds of the subsidiary companies for their claims. The carrying out of this plan is dependent entirely upon the success which the syndicate has in settling with the secured creditors. If the debt is reduced in this way to a considerable extent it is proposed that the Federal Company remain intact and that a collateral trust bond issue be made upon these securities. The minority stockholders of the Federal Company would then participate in any dividends which may come to the company after the debts have been cleared up.

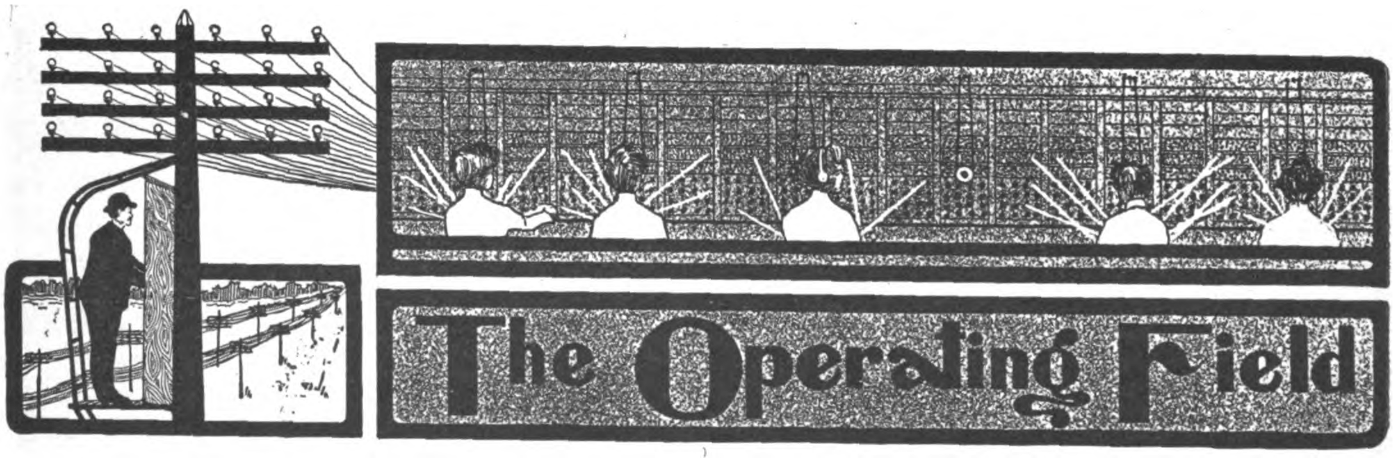
FOND DU LAC COMPANY REORGANIZED.

THE Little Wolf River Telephone Company, of Fond Du Lac, Wis., has been sold at auction to Leander Choate, of Oshkosh, Wis.

But two bids were received for the property, that of Henry Boyle, of Fond Du Lac, for $60,000, and Mr. Choate's for $65,000. The bonds of the company amounted to $60,000, but only about $48,000 were sold. Of the remainder, about $9,000 was deposited as security for a loan. This amount will have to be paid with the other bonds.

This company went into the hands of a receiver some time ago, as this plan was thought best by the stockholders in order to clear up its indebtedness and to put it on a sound basis. Mr. Choate was one of the largest holders of the bonds of the company. He will reorganize the company, and it will continue to operate Independent.

The sale by the receiver will not become operative until confirmed by Circuit Judge Kerwan. The cost of the system has been about $142,000. The company owns 450 miles of line. Stock for $25,000 has been issued.



The Operating Field

INDIANAPOLIS COMPANY EXPANDS.

By H. S. O'Brien, *Special Correspondent.*

At a recent meeting of the New Long Distance Telephone Company, of Indianapolis, Ind., a $5,000,000 mortgage was authorized to take the place of a $1,000,000 mortgage issued in July of last year. The bonds of the first mortgage will be exchanged for an equal number of the new ones, the holders having so agreed, the exchange to be made at once by the Union Trust Co.

The company's officers explain that the business has grown away beyond expectations and it took only a few months to demonstrate that the $1,000,000 mortgage would not cover the company's growth and that a larger plan of financing must be adopted. The new mortgage has therefore been made large enough to avoid the possibility of ever having to make a second mortgage.

The mortgage covers all the company's property of every kind now in possession and hereafter to be acquired. It expressly provides that no bonds are to be issued, except on order of the trust company, which must first be satisfied that the additions to the property will make additions to the income over and above bond interest and sinking fund.

With the proceeds of the bonds the company will first complete the lines between Indianapolis and Louisville, Ky., and Indianapolis and St. Louis, Mo., and construct additional circuits between these cities. These lines are to be open for business in ninety days. Additional circuits will be made between Indianapolis and Logansport and Indianapolis and Peru.

The old directors were re-elected as follows: S. P. Sheerin, A. F. Ramsey, H. B. Sale, A. H. Nordyke, Hugh Dougherty, Louis Hollweg, and C. J. Doherty. S. P. Sheerin was re-elected president, A. F. Ramsey vice-president, H. B. Sale secretary, and A. H. Nordyke treasurer. The annual report showed $16,602 carried to surplus, after payment of all dividends and expenses. The total surplus is now $30,688.

SUCCESSFUL FARM LINE COMPANY.

The West Newton Telephone Company, of West Newton, Ind., was organized two years ago. At a recent meeting it declared an annual dividend of 8 per cent. The story of this company is remarkably interesting. The address of the president, A. J. Newsom, read before the annual meeting, tells of the formation of the company. In part it was as follows:

"Two years ago four men met one night in the rear room of the post office at West Newton and organized the West Newton Co-operative Telephone Company. The following officers were elected: A. J. Newsom, president; J. M. Mendenhall, secretary and treasurer; J. M. Horton, Dr. Ratliff, D. C. Morgan, J. M. Mendenhall and A. J. Newsom, directors.

"Work was begun immediately and soon eight telephones were installed with the exchange in the same rear room in which the meeting was held. It was found that the co-operative system, although cheap, was limited in its usefulness, and it gave way to the present company. From this humble beginning we have grown to our present size, operating nearly one hundred telephones and having an exchange of the latest and best magneto type. Our pole lines are nearly thirty-five miles long, and carry about seventy miles of metallic circuits. We have lines on almost every road in the township. This is our past history in brief.

"The future outlook is very bright. With adequate funds we can double our subscription list without very materially increasing the cost to users. We will doubtless need several hundred feet of aerial cable in the near future, and will possibly have to construct a building to serve as an exchange and storeroom. The south territory is practically unoccupied, while near Maywood there are about twenty people clamoring for telephones. The same condition exists at Ben Davis and vicinity."

The company carries no debt, the sales from stock covering all expenses. The rates for service are $1.50 per month. Subscribers to the system have the privilege of connecting with 7,500 telephones in Marion County, having connection with the New Telephone Company in Indianapolis, and also toll connections all over the State and elsewhere. The company expects to have 150 telephones in operation by the end of the summer.

LONG-DISTANCE FACILITIES BROADENED.

By H. A. Lane, *Special Correspondent.*

PENNSYLVANIA will soon be thoroughly covered with Independent long-distance lines, which will give connection between the many companies operating in the State and also in surrounding States. Already the eastern part of the State has splendid facilities with the lines of the Keystone Telephone and Telegraph, the United Telephone and Telegraph and other long-distance companies, which have built up a network in that part of the State.

A company has been organized and will apply for a charter on May 18, which will give the western part of the State the service it has long desired. This company will be known as the Pittsburg and Johnstown Long-Distance Telephone Company, and its headquarters will be in Johnstown. The organizers are Sidney H. Browne, vice-president and general manager of the Pittsburg and Allegheny Telephone Company, Pittsburg; H. Y. Mayer, of Johnstown; A. M. Griffis, president of the Johnstown Telephone Company; E. D. Schade, general manager of the Johnstown Telephone Company, and Attorney John S. Weller, of Pittsburg.

The officers of the company will be: President, A. M. Griffis, Johnstown; vice-president, Sidney H. Browne, Pittsburg; treasurer, H. Y. Mayer, Johnstown; secretary, E. D. Schade, Johnstown, Pa. The capital stock will be $70,000.

The organization of this company is the most important step taken in the Independent field in Pennsylvania since the organization of the Pittsburg and Allegheny Telephone Company. The new company proposes to construct and operate lines through Blair, Cambria, Fayette and Westmoreland counties in Pennsylvania. The special object of the company will be to connect the Independent systems in Johnstown, Greensburg, Connellsville and Uniontown with Pittsburg. All these points now have thriving companies working and good exchanges, and with the long distance connection now assured will be powerful rivals of the Bell system. The new line will not only give subscribers of the Pittsburg and Allegheny Telephone Company direct connection with the points named above, but will also, through the Independent company, known as the Central Pennsylvania Telephone Company, give direct connection with Altoona, Mifflinsburg, Sunbury, Harrisburg, Columbia, York, Chambersburg and Gettysburg, Pa., and Cumberland, Md.

The organization of this new long-distance company has been effected largely through the efforts of Sidney H. Browne, who as vice-president and general manager of the Pittsburg and Allegheny Telephone Company, has made a notable record. The new company means a great victory for the Pittsburg and Allegheny Company, for it will give it far greater facilities for reaching distant points and make its service in many new sections superior to that of the Bell company. To the large towns along the proposed route of the new line the movement means greatly improved service and an impetus to the home companies, which have established good exchanges and lacked only long distance to make them all that could be desired. In addition to the points named, the new company will be the means of completing a great network of short lines connecting nearly every town of any importance in southern Pennsylvania, West Virginia and Maryland.

TELEPHONES ON THE MISSISSIPPI LEVEE.

A UNIQUE system of telephones will be installed to extend along the levee on the Mississippi River from New Madrid, Mo., to Memphis, Tenn. The telephones will be used by the levee engineers in construction work, etc., and will be particularly useful in case of a break in the levee, as was the case during the recent floods along the river. Plans for the system are now being drawn by Harry N. Pharr, chief engineer of the St. Francis Levee Board. Work will be begun in a very short time. It is likely that the work will be done directly under the supervision of the Levee Board engineers, although bids will be advertised for. The system is estimated to cost about $20,000. During a high-water fight the service that will be rendered by the telephone system will, however, make this comparatively large expenditure worth while.

Engineer Pharr is authority for the statement that if telephonic communication had been possible during the recent flood, thousands of dollars' worth of property would have been saved, because the engineers would have been able to make a much better fight against the high water than they could otherwise. They were greatly handicapped by the fact that they were entirely cut off from any kind of communication with each other.

THE BELL IN NEW ENGLAND.

A GOOD illustration of the desperate struggles of the Bell Telephone Company to eliminate competition in the New England field is furnished by a transaction which it has just engineered in Westbrook, Me., and which is likely to cause it considerable trouble. Westbrook had long been without telephone service at all, the New England (Bell) Telephone Company ignoring the place as being too small for its consideration. But when the Northeastern Telephone Company, of Portland, appeared before the Westbrook city council, asking for a franchise, the New England Company quickly decided that the dear people of Westbrook, after all, needed telephone facilities, and it also appeared before the city council. The Westbrook council was flattered by its sudden importance, and came to the conclusion that neither the Northeastern nor New England companies were offering fair terms; so it tabled both franchises. A local company was then formed and a franchise granted it, giving exclusive privileges for twenty years. If for any reason the company should wish to sell out, the city was to have a first option. The Westbrook company was given one year in which to commence operation, failure to do so meaning the forfeiture of the franchise. It promised to do this and to give service as cheaply as possible and to make the best possible connections with Portland—connections which the people were specially desirous of having.

Shortly after the permanent organization of the Westbrook Company, the New England Company came back with a proposition offering a far lower rate than it had offered before, and suggesting to the directors of the Westbrook Company that they sell out to the New England. Some of the members of the Westbrook Company were of the opinion that they should adhere firmly to the letter of their franchise and construct a pole line themselves to Portland, while the majority, influenced by the low rate offered by the Bell, decided that the only satisfactory way of securing Portland connections was over the lines of the New England Company by accepting its proposition. The latter plan was followed, the New England Company giving rates averaging from $18 for six-party line residence service to $39 for single line business telephones. The Westbrook directors were asked to resign by the New England Company, and it is now in exclusive control of the service.

Lewis A. Goudy, of the Northeastern Telephone Company, says he is going to Westbrook to see if he cannot get the people to rebel against the new arrangement. Mr. Goudy says that, although the New England Company has purchased the controlling interest in the Westbrook Company, it cannot buy the permit to dig up the street or erect poles. The permit was only given to the persons named in the franchise, and under the laws of Maine this grant will be held to apply only to the original grantees. He will endeavor to secure an injunction against the New England Company should it erect any poles or tear up the streets. He will also bring the petition for pole rights of the Northeastern Company before the new city government, and he is confident that he will be successful, as the people do not want service furnished by the New England Company.

CONNECTICUT'S PLEA FOR TELEPHONES.

IN writing to the Hartford, Conn., *Courant*, Mr. R. L. Andrews, of New Britain, Conn., who has been actively connected with the Independent telephone movement for the last four or five years, tells the readers of the *Courant* of the enormous development of Independent telephony, many of them having never heard of an Independent telephone company before. Mr. Andrews calls attention to the underhand methods of the Bell Company to keep a firm hold of its monopoly in Connecticut and other New England States by subsidizing the press and the other ways, all of which have been told before in the columns of The American Telephone Journal. He then makes a plea for more telephones in Connecticut, a State thickly populated and rich in manufacturing resources and which should have double the present number of telephones. A portion of the letter is reproduced below, as it may prove interesting to our readers and helpful to the cause in New England, which more than any other one thing needs publicity:

"It has been my good fortune the past five years to be connected with the Independent telephone interests," says Mr. Andrews. "Through the States of Indiana, Iowa, Minnesota, Wisconsin, Michigan, Ohio, Pennsylvania and northern, western and now eastern New York, as well as Louisville, St. Louis, Memphis, Knoxville and numerous other cities, the growth of the telephone business has been enormous, particularly as applied to the Independent movement in competition with and opposition to the Bell license companies. In Ohio the total number of telephones is 225,000, the Independent companies having 155,000 telephones and the Bell companies 70,000. In Connecticut we have less than 20,000 telephones, paying the State a tax of 70 cents each on every transmitter. The Southern New England Telephone Company showed on July 1, 1902, less than 20,000 telephones in the State, with a population of 908,355. Cleveland, O., with a population of 381,768, shows 24,000 telephones in use.

"A proportionate number for Connecticut would mean at least 50,000 telephones. (With only four times the population, Ohio has eleven times the number of telephones that Connecticut has.) This would give a revenue of $35,000 to Connecticut, against $14,000 received under a monopoly protection which deprives the farmer and laboring man of competition that would place the telephone within his reach.

"Less than 4 per cent. of the population of this country are using telephones," Mr. Andrews continues, "which indicates the great opportunity for increase, while Connecticut has a little over 2 per cent., or half the average of the country. House bill No. 60, which calls for the repeal of Sections 3918, 3919 and 3920 of the General Statutes of Connecticut, would do away with the unjust and oppressive law requiring a company or association, to 'prove public necessity and convenience' before establishing an exchange service in new territory. Taking the statement of one of the Southern New England telephone company's attorneys, made two years ago at a hearing held in Hartford, as being correct, 'it is impossible to prove that public necessity and convenience require the establishment of a competing service.'"

The Editor's Page

INDEPENDENT DEVELOPMENT IN CANADA.

THE *Canadian Engineer* is the leading technical paper in the Dominion devoted to electrical industries. Its management is conservative and its editorial matter is always authoritative. It is gratifying, therefore, to read in the current number of this periodical a resume of the telephone situation that shows a state of affairs highly creditable to Independent progress. Telephone men on this side of the line have been in the habit of thinking but slightingly of the field in Canada because the situation seemed dominated by the Bell, but a glance at the following extracts from the *Canadian Engineer* shows very clearly that this is not so:

> We are glad to notice more healthy signs of public attention to the telephone question, which has become for Canada a more serious problem than it is now, or ever was, in the United States. When the Canadian Bell monopoly is defended, and its interests even advocated, by a cabinet minister, as was the case when this company's application for an increase of capital came before parliament last year, it is time the people of Canada, and especially those intrusted with the governance of our cities and towns, begin to realize what new tribute will be laid upon them in the near future as fresh power is acquired. The remarkable development of the work of Independent telephone companies in the United States in recent years of which we have given statistics continues and the Bell is no longer the dread of cities and communities who formerly felt helpless in the grasp of that great corporation. The light is fairly dawning in Canada now, too, and news items in this issue show that our cities and towns are at last beginning to realize that their souls are their own.
>
> But, after all, the question of starting Independent companies should be determined, not by a feeling of resentment against the Bell monopoly, however much this feeling might be justified, but by a cool calculation on the part of local investors as to whether they can give a better service to the people, at a more reasonable price, and at the same time secure a good return for the money invested. The remarkable thing in the history of the Independent telephone movement in the States is that in spite of the poor management of many of these local companies, starting as they have without previous experience, and putting in unwisely chosen managers, there have been scarcely any cases of absolute failure, while those few cases of unprofitable investment have been due to causes which would have shown worse results in almost any other business.
>
> It is gratifying to learn that Port Arthur and Fort William, whose well equipped Independent systems were described in a recent issue, have shown themselves proof against the blandishments of the Bell Company, which would be delighted to take over and pay for the municipal systems now working there. As will be seen in our news columns Toronto Junction is moving to have a municipal system of telephone, and Hamilton is considering a second offer from the United States. Welland, Ont., and Newtonville, Ont., are establishing Independent exchanges, while in Montreal some New York gentlemen have just purchased the franchise of the Merchants' Telephone Company, a local competitor which the Bell Company thought it could safely neglect.
>
> Let the good work of Independent telephones go on and later on the question of long distance connections can be dealt with by legislation in the interest of Independent companies when they become a stronger aggregation. The problem of long distance connections is not so serious a drawback, as we have already shown. In the course of ordinary business the majority of out-of-town calls are within a radius of fifty miles, and groups of Independent companies working together can supply these calls in the majority of cases; and where longer distances are to be reached the Bell is still available to those who wish to pay the rate. The opinion of Mayor Urquhart, of Toronto, who is a lawyer and has studied this matter, is that the solution of the long distance problem is to be found in legislation compelling the Bell Company to furnish at a reasonable rate connections with local companies whose subscribers require such service.

It would be hard to find anything quite as frank and encouraging in any of the papers on this side of the border devoted to the general electrical field. They all pretend to devote some of their space to telephony and print more or less matter each week bearing on the subject, but neither in their editorial nor their general columns would room be given to any such encouraging summary. Either because they have formed the habit or because they are under obligations not to be resisted, the electrical papers with us continue to concede the supremacy of the Bell, ignoring steadily the fact that the Independents have at least half a million more instruments in operation than their rivals.

INDEPENDENT TELEPHONE SECURITIES.

THE course of the Delaware and Madison Counties' Telephone stock on the Indianapolis Stock Exchange is another illustration of the confidence of the investor in Independent telephone securities. Delaware and Madison was but recently listed. Until then the stock had not been traded in, going as a bonus to buyers of the bonds. Bids started at $20 a share when the stock was listed. The price steadily advanced and is now quoted at $40 offered and $46 asked. Recent sales have been at a split between the bid and ask. Some of the holders have set $50 as the parting mark.

The company operates in a rich field—the gas belt—including such cities as Muncie, Anderson, Elmwood and Alexandria. In the larger cities underground conduits are used and all circuits are copper metallic. No rentals were collected until the first of this year, but the receipts for the first quarter went away beyond all expectations. If the pace is kept up there will be $25,000 to be distributed as dividends the first year. The capacity is already overtaxed at some of the exchanges and enlargements are being made. The company's 5 per cent. bonds are held at $90. New Telephone stock (Indianapolis) is held at $90, the first 5 per cent. bonds at $95, and the second 5s at $85. New Long Distance stock (Indianapolis) is held at $67. These are all advancing.

PROF. BELL ON FARMER SERVICE.

DR. ALEXANDER GRAHAM BELL, while on a visit recently to Indianapolis in connection with his work for the deaf and dumb, discussed the plan of Senator Fairbanks, of Indiana, to extend especial quick mail delivery by making farmers' telephone lines part of the Government mail service. He said it was immensely practical and could be done with great success. "The time has come," he said, "when the Government can no longer ignore the part the telephone is playing in our community, State and National life. Telephone conversations have been held to be legally binding in many cases. Telephone lines are now running out through farming sections and to places remote from post office, telegraph and telephone stations. The Senator's scheme is to have a special 10-cent stamp that will be notice to the postmaster to open the letter and telephone its contents. Such an addition to the mail service would not only add to the effectiveness of the entire service and occupy a field that the telegraph does not even invade, but it would have the effect of entirely covering the country with farmers' telephone lines and it would only be a few years until every up-to-date farmer would have a telephone hanging on his country home wall. These, connected with trunk lines, would probably mean that telephone charges would be reduced in time because of the enlarged use of the telephone."

DECISION ON EMINENT DOMAIN.

THE Appellate Court of Indiana has decided that a telegraph (or telephone) company has a right to set its poles on a railroad company's right of way. This reverses the decision of the lower court in a case in which the Monon Railroad and the Postal Telegraph companies were the contestants. The Circuit Court judge based his decision on the proposition that property already taken for a public use under the right of eminent domain cannot, in the absence of express legislative authority, be taken for a second public use.

The higher court decided that another may use land once appropriated by eminent domain when that use is not inconsistent with the first use. A telegraph (or telephone) company may condemn a right of way for its poles and wires longitudinally along the margin of a railroad right-of-way, where such line can be constructed without interference with the use of the right of way for railroad purposes.

FOREIGN CURRENTS

By "The Arrester."

THE National Telephone Company has recently put on the market a new telephone appliance, which has been christened the "metaphone." The metaphone is intended to be connected to ordinary electric bell wires to give interior telephone service in ordinary private houses. Apparently, this device is considered a great novelty in England, as the daily papers have been giving the "metaphone" a large amount of free advertising. The equipment in its simplest form consists of a pair of small hand combination transmitters and receivers. One is for the kitchen or servants' end, the other for the dining-room or employer's end. The father of the family, with no other tool than a screwdriver, can connect up the latter instrument to the existing bell-push, and the former instrument to the existing bell in five minutes. The directions sent out with the metaphone are simplicity itself. Calling up Sarah Jane is done by merely pressing the original bell-push. The arrangement is capable of modifications so that the kitchen can be called up from any number of rooms through the existing indicator board. The fitting up of the instruments is done free on premises within reasonable distance of any of the company's offices. The great advantages of the "metaphone" are its simplicity and its cheapness. The combination hand sets, which have magneto transmitters, are sold for about $2 each. As a popularizer of the telephone, the cheap domestic instrument should prove quite a useful missionary.

Glasgow's Municipal System

The proposed additional loan of $400,000, increasing the capital of the Glasgow municipal telephone system, has been approved by the Secretary for Scotland, but consent is given to the additional expenditure not apparently without a certain amount of misgiving as to the conduct and future of the enterprise, as in the correspondence the Secretary for Scotland states that approval of the loan is granted "in reliance on the offer of the Corporation to make such arrangements, by setting up a reserve fund or otherwise, as will prevent the reasonable possibility of the ratepayers being called upon at a future date to pay off a debt contracted in providing—at a price which, if this course is not taken, would be under cost price—a service which is used by a comparatively limited proportion of the community." The Secretary for Scotland does not possess unlimited faith in the telephone enterprise of the Glasgow municipality, as he suggests that the Corporation would do well to consider whether they should not materially shorten the currency of telephone loans by setting aside larger annual sums for repayment of debt than at present contemplated, either in addition to or in substitution for the depreciation fund. In reply, the town clerk pointed out that up to the present a considerable portion of the capital expenditure had not been directly remunerative; but now that the great bulk of the plant was, or was about to be, brought into actual use, the corporation expected that in addition to setting aside sinking fund at the rate of 2 1-3 per cent. per annum, and maintaining the system out of revenue in a thorough state of efficiency, they would be able to lay aside a substantial reserve to meet any expenditure that might arise in future, which shows that the town clerk of Glasgow is of a very sanguine disposition.

Government' Explains Tardiness

A paragraph in the London *Electrical Engineer* gives some idea of the rapid progress made in bringing into operation a government telephone system. In the House of Commons the British Postmaster General was asked to explain why it was that although the Post Office telephone cables had been laid in a certain western district of London, locally known as Paddington, over 18 months ago, no house had yet been connected to the wires, and it was still impossible to obtain the Post Office telephone service in that part of London. In reply the Postmaster General stated that the underground wires referred to were to be connected with a new exchange which was being established in Bird Street, Oxford Street, and would be known as the Mayfair exchange. Unexpected difficulties occurred in the acquisition of the premises in which the exchange was to be situated, but the necessary structural alterations were begun in the autumn, and the office of works expected that they would be completed in about four months. The installation of the switchboard would then be at once taken in hand and this would occupy about another four months. He promised to do everything in his power to hasten the opening of this exchange.

Example of Government Methods

This incident is perhaps a not unfair sample of government management of telephone matters. To begin with, any traveller who has explored London knows that the Paddington district and the Mayfair district are pretty far apart. In fact, the centre of Mayfair is fully two miles distant from the centre of Paddington, and to serve the two districts from one exchange is rather an extravagant proposition. But to lay down a whole system of underground cables before having selected a site for the exchange, and to occupy about two years after the laying of the cables in obtaining a building and getting it into proper condition to receive the central office equipment, is more extravagant still. The difficulties that occurred in the acquisition of the premises must have been quite mildly described by the qualification of "unexpected." All told, it seems that it will be between two and three years after the wires were put down that the Mayfair exchange will be ready to give service to the Post Office telephone subscribers in a large section of London. Only a government department can afford to do business in this extremely leisurely manner. No company could afford to let difficulties, even of the most unexpected nature cause such a prolonged stagnation of its business.

Interesting Remarks on Volta

The British Institution of Electrical Engineers, following a most admirable custom, established a few years ago, is to make a visit this spring to Italy for the purpose of meeting Italian electrical engineers and of inspecting various Italian electrical establishmnts and factories. In an article by Mr. J. J. Fahie, the well-known historian of the telegraph, on the forthcoming visit, giving notes of things to be seen at Lucerne, Como, and Milan, the principal stopping places of the expedition, there are some very interesting remarks on Volta, the immortal inventor of the electric battery. Volta was born at Como in 1745 and died there March 5, 1827. In the village church of Camnago, close to Como, is Volta's tomb. At the Brera Palace in Milan, is preserved the remains of the collection of Volta's books, papers, machines, decorations and personal belongings. These relics were originally preserved in the apartments occupied by Volta, but owing to the pecuniary embarrassment of the family they were in danger of being dispersed, and the whole collection was bought for $20,000 by the Academy of Sciences of Lombardy and lodged at Milan. At that time the collection included all the instruments Volta had himself made or invented, including the original battery, or voltaic pile, exhibited by Volta before Napoleon in Paris, in November, 1800. Unfortunately the greater part of the collection was destroyed by the fire at the Electrical Exhibition in Como in 1899. This was truly an ironical stroke of fate, as the exhibition was held to celebrate the centenary of Volta's great invention.

Quoted from Mr. Fahie

"The invention of the electric pile and 'crown of cups,' with which his name is indissolubly connected," says Mr. Fahie, "is Volta's crowning work, and is the direct outcome of a controversy with another famous electrician, Galvani, of Bologna, whose name is similarly enshrined in the words 'galvanic' and 'galvanism,' and is made familiar to us all in 'galvanized iron.' Galvani, who was an anatomist as well as an electrician, had observed contractions in the muscles of a frog suspended by a copper wire from an iron railing; and he explained the effect by supposing the nerves and muscles of the animal to form a kind of Leyden jar, which was charged and discharged whenever an external circuit brought them into electrical contact. Volta, however, after a long course of experiments, showed the frog's body to be only a delicate electrometer—the stimulated rather than the stimulator. The invention of the electric or voltaic pile was first made known in a long letter (March, 1800) to the President of the Royal Society, in London. In England it caused the greatest excitement among scientific men, and in the hands of Nicholson and Carlisle, Humphrey Davy and others soon gave rise to far-reaching results."

Napoleon and Volta

Impressed with the importance of the results likely to flow from this new invention, Napoleon Bonaparte, then First Consul, invited Volta to visit Paris, and there, at the Institute, to explain personally his invention and to expound his views as to its probable uses as an instrument of scientific research. Volta accepted the invitation and gave three lectures in Paris. One of these was attended by Napoleon, who was enthusiastic over the results achieved by Volta. He promptly organized a commission to verify the experiments, gave Volta a special gold medal and $1,200 for his travelling expenses, and later founded an annual medal of $600 value for the best experiments in the "galvanic fluid," and a special prize of $12,000 to be awarded to whoever should give by his researches an impulse to electricity or magnetism comparable to that which it received from the discoveries of Franklin and Volta. This grand prize was never awarded. Probably Napoleon, after 1800, found other uses for the money. But the $600 medal was first awarded to Sir Humphrey Davy in 1808. All this has little to do with present day telephony, but telephone men owe so much to the electric battery that they must surely be interested in these historical notes on its great inventor.

TELEPHONE CIRCUITS—ARTICLE VII

By H. P. Clausen.

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ONE of the most important subjects to telephone companies is the party line, this class of service having been found desirable, both when viewed from the subscriber's standpoint and from the exchange manager's. The subscriber finds that he can get service on the party-line basis that is fairly satisfactory, and, in addition, the substantial reduction in the subscription rate becomes very attractive. The exchange manager finds that the introduction of the party line results in a substantial increase in the number of subscribers which he can secure and that without any considerable additional expense for central office equipment. When party-line service is established, the manager finds that where previously he had a one-thousand line switchboard the capacity of his board immediately arose to two, three or four times as much.

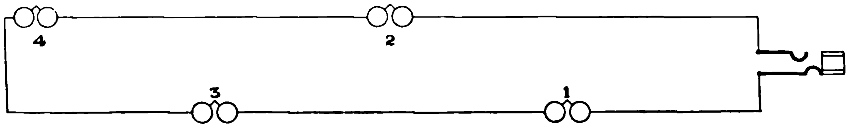


FIG. 239.

In order to place the matter of party-line service before the reader in an easily understood manner, and to cover the different systems which might be adopted, it is necessary to take into account the party-line systems which might be extended outside of a city; for example, farmers' lines circuits between small sub-exchanges, larger central offices or toll exchanges. In presenting these different systems, the writer will not make any attempt to describe anything which has not been tried in actual service and found to give service of a well-known character.

Fig. 239 shows the series telephone circuit. In this circuit it is necessary for the signalling, as well as the speaking currents, to pass through all of the stations connected to the line; thus, when station 1 is speaking, the evil effect to the talking circuit of the apparatus contained in stations 2, 3 and 4 is present. The objections to a series bell in the speaking circuit being discovered, numerous methods were suggested in attempts to overcome the impedence of the telephone equipments to the voice currents. One of these consisted in connecting a comparatively high resistance, but non-inductive, shunt across the windings of the bell, the idea being to provide a path for the speaking currents outside of the bell magnets. To an extent this plan was successful, but it considerably reduced the signalling efficiency of the circuit. Then condensers were cut across the circuit, but were found to be objectionable. In addition it was found almost impossible to completely eliminate inductive disturbances from one line to another, owing to the naturally unbalanced condition of the circuit, as the instruments were cut in on either side, and therefore a complete neutralization between adjacent circuits was impractical.

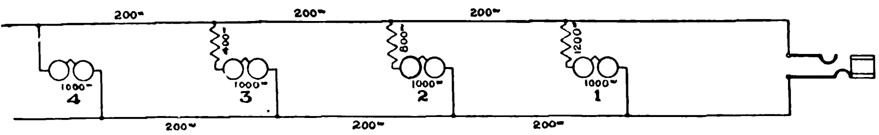


FIG. 241.

In order to overcome the objections of the series bells and permit of obtaining complete electrical balance it became necessary to devise some system in which the talking circuits would not be required to pass through the signalling apparatus. This resulted in the invention of the bridging system, which is shown diagramatically by Fig. 240. In this, which is one of the best known party-line systems in existence, the bells are connected across the line, and the signalling current generated at the subscribers' station passes directly to the line wires. This system, while it produces a very satisfactory arrangement, possesses the disadvantage that the central office operator cannot reach with equal facility, the most distant subscriber. Referring to Fig. 241, assume that station No. 1 is quite close to the central office and that the line wires do not present any appreciable resistance, but from station 1 to 2 there is a line resistance of 400 ohms, from station 2 to 3 400 ohms additional, and so on from stations 3 to 4 an additional 400 ohms, etc. When signalling over this circuit from the central office, it is apparent that the first station on the line must receive the largest amount of current; say, for example, that the generator is producing current at 100 volts, with a 1,000-ohm ringer we have approximately one-tenth ampere of current passing through the station equipment, but in station 2 this current is reduced, as we have an additional 400 ohms resistance, giving a resistance of 1,400 ohms when ringing through station 2 against 1,000 ohms in station No. 1, and so on until passing to the fourth or last station on the line it is found

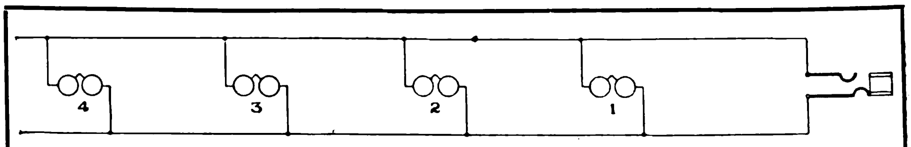


FIG. 240.

Editor's Note.—The first article of this series appeared in the issue of November 22. They will continue many months.

that we have a resistance of 2,200 ohms inclusive of the station apparatus, against 1,000 ohms at the first station, and it sometimes occurs that the line resistance is two or three thousand ohms against an instrument resistance of 1,000 ohms. In such cases it is a very difficult matter to ring the farthest instrument and it becomes desirable to introduce some system of equalizing the resistance. This is effected by adding a non-inductive resistance in series with each subscriber's station equipment. Thus it will be observed that the fourth station instrument on the line has no resistance connected in series, as it is connected directly to the line wires. Now, instead of the third station on the line having the advantage over the fourth station by a reduction of 400 ohms line resistance, it is placed on an equal basis with the fourth instrument by using a 400-ohm resistance coil. In the second instrument we have a 400-ohm resistance in favor of this station, and adding this to the 400 ohms resistance between the third and fourth stations, we have a resistance of 800 ohms and on the first station a resistance of 1,200 ohms. With this condition we have an almost perfect equalization of the different station equipments and an ideal circuit for signalling from the central office, each station on the line receiving approximately an equal amount of current, and therefore providing a much more efficient ringing service.

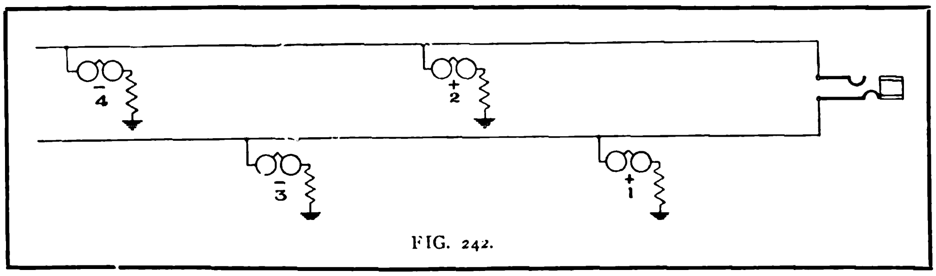


FIG. 242.

As respects the ability of the subscriber to reach the central office, the system is designed in such a way that the signalling to the central office will be done over the ground circuit and over the two parallel telephone wires, the circuits of this system being shown more clearly in another portion of the article.

Before the bridging system shown by Fig. 240 had been developed, certain installations in France were equipped with selective signalling apparatus, the system being so arranged that two parties were placed on one side of each metallic circuit and connected to ground, permitting a four-party selective service, the first bell on the line responding to a current passing in the minus direction, while the second bell on the line was made to respond to a current flowing in the plus direction, both line wires being similarly equipped and therefore providing for a four-party selective service.

When the writer states that this system was used before the "Carty" system of bridging bells, it is only natural for the reader to infer that selective signalling apparatus must have been operated prior to 1888, which appears to have been the case.

The above system contemplated the circuit conditions shown by Fig. 242, in which the first station signalling equipment is arranged to respond to a plus current and the second station equipment to a minus current, the sleeve side of the line being similarly equipped.

LOCAL OWNERSHIP AND OPERATION

By Reginald F. Fennell.

There is no better way to insure permanent support of a telephone property (with the exception of first class service) than to have local stockholders or local people financially interested in the enterprise. Interest and support will be given more freely to the company from those financially interested, as they derive benefit directly therefrom.

By interesting local financiers before commencing to operate, many unforeseen troubles are averted. The ease with which stock can be placed is often much greater before operation is commenced, especially where people are desirous of obtaining a local Independent exchange, than after the exchange has been established.

The City Council or governing official body's actions are naturally more or less influenced for or against a local or outside company, and many matters which cannot be foreseen, and which prove more or less costly, are often avoided in this way.

Sentiment has played a great part in the success of Independent companies in the past, but when a competing company gives good service and lower rates (particularly now that the telephone business is becoming more universal and the public more educated to the use of the telephone), this factor cannot be depended upon by Independent companies to the extent that it was when Independent telephony was in its infancy.

In addition to local support of the description referred to, to succeed especially in the face of competition, which, if not on hand at the outset will arrive eventually, prompt remedy of troubles and courteous treatment are essential. These tell in holding subscribers, even as service will eventually be the prime factor in the Independent field. Although local influence is of great assistance in holding subscribers and obtaining new business, yet unless good commercial service is given, it cannot be depended upon. However, the advantage of having local stockholders cannot be overestimated in the many benefits that accrue, where the company is dependent more or less on the good will of the City Fathers and citizens for the support of the business.

Courteous treatment and prompt response in clearing troubles as they arise, or, better still, in anticipating them so that they do not occur, by regularly making a general inspection, goes a long way towards holding business.

The question of rates and collections should be given as much attention as any other department of the business. To quote one rate to one party and another rate to another for the same service, is to make enemies and cause dissatisfaction. A universal rate for each class of service should be maintained. Where the rate quoted and maintained is the same for all subscribers, it aids the collector; he is not assailed on all sides by the statement that one subscriber is charged more than another.

Accounts should be collected promptly according to the contract. There are a large percentage of subscribers connected with every telephone exchange who are financially good so far as rental payments are concerned, provided the subscriptions are collected when due. This is often not the case, however, where the subscriber of the description suggested is presented with a bill for three or four times the amount that he has been in the habit of paying. When this is the case he is often unable to meet the larger payment promptly, and either offers something on account or refuses payment. Where a part payment is made and various deposits at different times thereafter to liquidate the account, additional work is involved on the part of the collectors and bookkeeping department. Itemized statements and information are often requested, if for no other purpose than to delay payment; the additional expense involved by getting these out and the additional work in connection with making the collection is eliminated, where the payments according to the contract are enforced and loss owing to non-payment averted.

Where service is removed owing to non-payment of rentals, future business in many cases is prevented, the company requiring the previous account to be paid before additional service is furnished, and the subscriber, sooner than pay the amount due, patronizes the competing company.

Local stockholders, first class service and good management hold subscribers, increase business, facilitate collections and therefore tend to secure the success of the exchange and promote the independent movement generally.

The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

GAS COMPANY CANNOT OPERATE TELEPHONE LINE

THE Supreme Court of Pennsylvania, in the case of Woods *v.* Greensboro Natural Gas Company, holds that the right of such a company to locate a right of way for a pipe line does not give it the right to construct a telephone line along its right of way. The facts were that the plaintiff owned land in Elizabeth and Forward townships, Allegheny County, across which the gas company proposed, in the exercise of the right of eminent domain, to locate a right of way for laying pipe lines and for constructing a telephone line to be used only in the necessary operation of the pipe line. The company had begun its proceedings by filing a bond to secure to the plaintiff the payment of damages and the bond had been approved by the court of common pleas. The plaintiff objected to the construction of the telephone line and brought suit to restrain the gas company from proceeding further.

The court granted the injunction and its decree was upheld by the supreme court. The latter court, speaking through Justice Potter, reasons as follows: The question is merely one of corporate power and is to be determined by an inspection of the company's charter and the statute under which it is incorporated. The rule for construing such statutes is "That which a company is authorized to do by its act of incorporation it may do. Beyond that, all its acts are illegal. And the power must be given in plain words or by necessary implication." The act of 1885, by section 10, gives to companies incorporated under its provisions "the right of eminent domain for the laying of pipe lines for the transportation and distribution of natural gas." Nowhere do we find that the right of eminent domain bestowed upon the company extends to the construction and operation of a telephone line.

The company argues that the construction of a telephone line along its right of way is a necessity in carrying on its business. But this contention is not supported by the facts. The company has been producing and transporting gas through its pipe line for six years past and had been operated without a telephone line, except such use as it could make of public lines. It is not impracticable to operate a pipe line without a telephone line, although it may be highly inconvenient and expensive to do so. Inconvenience, however, is not enough to justify a claim to a grant by implied necessity.

Woods v. Greensboro Natural Gas Co., 54 *A.* 470.

STOLEN SWITCHBOARD DISRUPTS COMPANY.

THE Dry Grove Party Line Company, an independent telephone company composed of farmers of Dry Grove Township, McLean County, Illinois, is about to be disrupted by petty disputes among stockholders. A number of stockholders have brought suit in the circuit court at Bloomington, asking that the line be sold and the proceeds, after paying debts, divided among stockholders. J. E. Otto, one of the stockholders, was employed to construct the line. It was arranged that the switchboard should be established at the home of one Patton, but, it is charged in the bill of complaint, Otto took possession of it and refused to give it up until complainants brought suit by replevin. This naturally caused ill feeling and many clashes between Otto and the others. The complainants allege that Otto listened while others were talking and slandered complainants and their families; that they then offered to buy his stock at more than it was worth. He refused and at a meeting of stockholders they voted him out of the company and $25 to pay for his stock. They also appointed three men, who disconnected Otto's house by taking down the wire, but it is charged he put it up again. The bill of complaint, besides asking a sale of the line, prays for an injunction restraining him from connecting his house with the system and from suing out a writ of replevin to recover the switchboard.

SLANDER OVER THE TELEPHONE.

THAT slander can be uttered over the telephone is charged in a suit brought by Stephen Pandur, of Braddock, Allegheny County, Pa., against Isidore Klein, a wealthy vessel owner of the place. The plaintiff charges that when a man to whom he applied for employment called up Klein, a former employer of plaintiff, and inquired about him, Klein answered that the plaintiff was a thief and had stolen $16 from him. Pandur denies this and asks damages.

MISSOURI INDEPENDENT CONVENTION

By Wm. H. Elges, *Special Correspondent.*

THE seven Independent telephone companies whose lines run into La Grange, Mo., held a convention recently in La Grange. The companies represented were the Highland Telephone Company, the Prairie Telephone Company, the Canton and La Grange Telephone Company, the Wyaconda Telephone Company, the Bozarth Telephone Company, the Lindale Telephone Company No. 1 and the Lindale Telephone Company No. 2. About forty stockholders of these companies were present.

John H. Blackburn was elected temporary chairman and B. S. Bozarth temporary secretary. The object of the meeting was to establish an exchange in La Grange and install a switchboard. For this purpose a motion was carried that they issue stock at $10 a share. It was decided not to commence work until at least $500 had been subscribed.

A motion was carried that the companies form a permanent organization, to be called the Farmers' Telephone Exchange. Officers were then elected as follows: John H. Gnuse, president; E. F. Westhoff, vice-president; B. S. Bozarth, secretary, and W. H. Solter, treasurer. One director was elected to represent each of the companies as follows: John H. Blackburn, Highland Telephone Company; Daniel Adams, Prairie Telephone Company; Adam Wolfmeyer, Wyaconda Telephone Company; A. Devilbiss, Bozarth Telephone Company; C. F. Hashamack, Lindale Telephone Company No. 1, and Harmon Spilker, Lindale Telephone Company No. 2.

The directors were authorized to begin work as soon as the $500 was subscribed. After the meeting had adjourned the directors elected John H. Blackburn, chairman, and Daniel Adams, secretary. Before the adjournment, however, Alfred Sellers, of Sellers, Mo., who has had considerable experience in the Independent telephone industry, gave a very instructive talk on consolidations of telephone companies.

Patents

HOOK SWITCH LOCK.

James E. Head, of St. Louis, Mo., patents (No. 725,338) and assigns to the Controller Company of America a coin-actuated lock for telephone hooks. This is a patent for an improvement in coin boxes, whereby it is impossible to operate the telephone until the proper coin has been deposited. It is illustrated in Figs. 1 and 2. The inventor places upon the side of an ordinary telephone set the apparatus shown in Fig. 1, which consists of a bar that

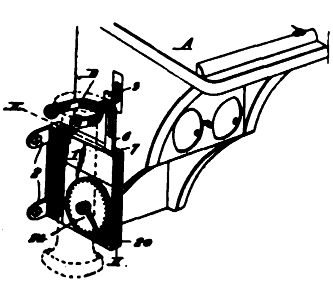


FIG. 1.

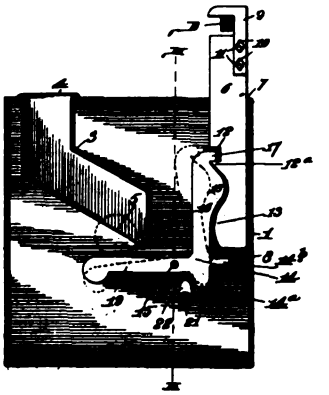


FIG. 2.

secures the hook switch in its lowest position. This bar, as is shown in Fig. 2, extends inside of the box 1, and is there held in place by the lever 16. There is a coin chute 4, and if the proper coin be dropped into this chute it will fall upon the end of the lever 16 and disengage it from the locking bar 6. The telephone hook is then at liberty to rise.

LAMP JACK CIRCUIT.

Henry P. Clausen, Chicago, Ill., patents (No. 726,215) and assigns to the American Electric Telephone Company a circuit arrangement for lamp jacks. This is a patent for improving the circuit to be used with lamp-signal switchboards, and is illustrated in Figs. 3 and 4. Fig. 3 shows the existing type of circuit in which every alternate spring of the various lamp jackets is connected to

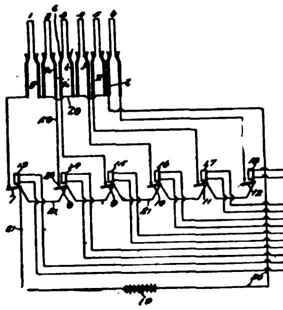


FIG. 3.

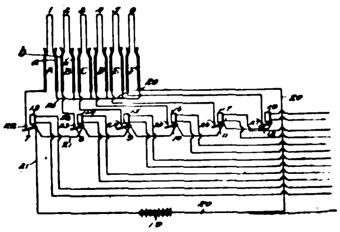
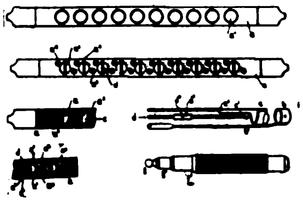


FIG. 4.

one side of the battery and the alternate spring to the other side. Under such circumsances the springs are easily short-circuited. Mr. Clausen's improvement is shown in Fig. 4, from which it is easy to see that the adjacent springs of each jack are connected to the same side of the battery, while the opposite springs are connected to the other side. Thus it is claimed that much difficulty in short circuit may be obviated.

IMPROVEMENT IN SPRING JACKS.

Charles E. Scribner, Chicago, Ill., patents (No. 726,105) and assigns to the Western Electric Company a spring jack for telephone switchboards. This is a patent for an improved spring jack, illustrated in Figs. 5 to 11, inclusive. Fig. 6 is a section of the jack, and Fig. 10 a detail of the springs. This jack is constructed by boring into a plug of hard rubber, after the well-known fashion of the Western Electric Company. The springs, as shown in Fig. 10, are secured in individual channels bored out of the rubber, as shown in Figs. 6 and 7, which are self-explanatory. This jack



FIGS. 5, 7, 8, 9, 10, 11.

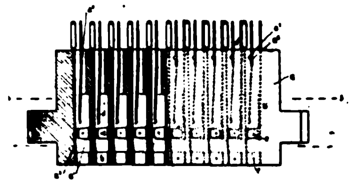


FIG. 6.

differs from previous designs, chiefly in the shape of the sleeve spring *C*, which is bent into a semi-circular form, as shown in Fig. 10, and thus secures a better contact for the plug.

TELEPHONE RECEIVER HOLDER.

Gabor Königstein, San Francisco, Cal., patents (No. 725,750) and assigns one-half to Max Horwinski, Jr., and Edward Horwinski, a telephone receiver holder. This is a patent for an improvement in receiver holders so that the receiver may be adjusted to the ear of the person using the telephone. It is illustrated in

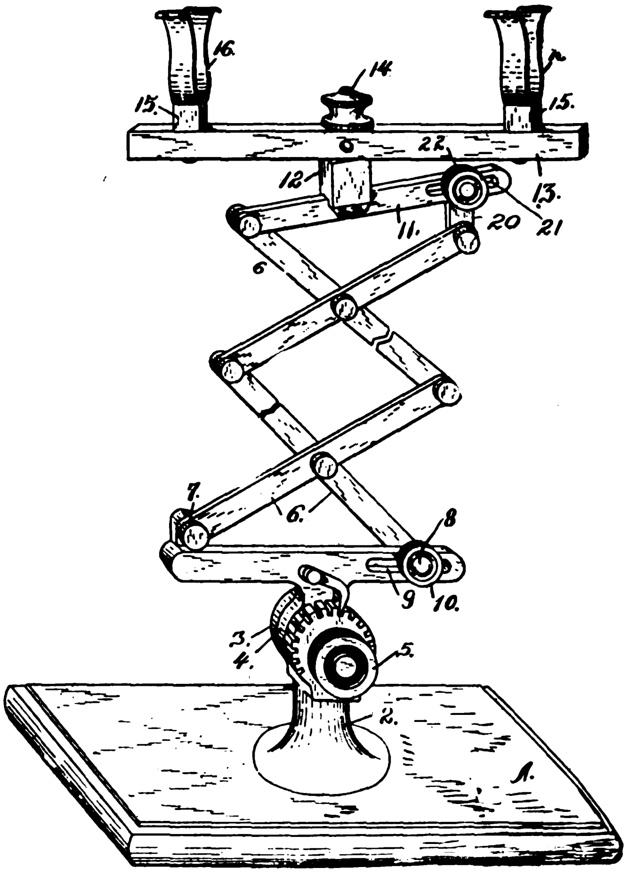


FIG. 12.

Fig. 12, which is sufficiently explanatory to need but little description. There is a base board *A*, which carries a lazy-tong's motion that carries two spring clips, 16 and 16, for holding the receiver. By this means the receiver may be mounted in any desired position and clamped, thus obviating the necessity of holding to one's ear.

LINE INSULATOR.

Ferdinand W. Gregory, New York, N. Y., patents (No. 724,848) an insulator. This is a patent for an improvement in insulators to be used on aerial lines. The insulator is so molded as to have shelf-like projections extending outward from the wire groove. Into the recess formed the lips and the line wire is placed, these lips supporting the wire and giving it a broader bearing upon the insulator.

The Week's Messages.

FINANCIAL

BYRON, ILL.—The Byron Telephone Company has increased its capital stock to $10,000.

CHICAGO, ILL.—The American Electric Fuse Company has increased its capital stock from $25,000 to $100,000.

FARMINGTON, ILL.—The Farmington Citizens' Mutual Telephone Company has increased its capital stock from $2,500 to $5,000.

GALESBURG, ILL.—A report has been made to the stockholders of the Galesburg Union Telephone Company showing that of the $150,000 stock, $135,000 had been subscribed, and that after paying interest and all expenses, there was 4 per cent. left. The stockholders present were so pleased that they took $8,000 more of the stock. The company has now nearly 1,700 telephones in use in Galesburg, and the revenue from tolls is constantly increasing.

HILLSBORO, ILL.—The People's Mutual Telephone Company of Hillsboro has increased its capital stock from $5,000 to $10,000.

DES MOINES, IOWA.—John C. Hume, counsel for the Mutual Telephone Company, has been directed by the board of directors to confer with the city council with the view of securing a cancellation of the alleged obligations due the city. These obligations are represented by $10,000, which, under the provisions of the ordinance giving the company a franchise, it agreed to pay in the form of 5 per cent. of its gross receipts annually. The company, in view of the recent decision by the Supreme Court, holding that all companies whose plants were installed in the city prior to 1897, when the code was revised, do not require a franchise from the city at all, contends the provision is not binding and, therefore, that it does not owe the city anything. It contends further, that because of the passage of a recently passed regulating ordinance, requiring the company to place its wires in underground conduits in a district considerably greater in area than provided for in its original ordinance, portions of the original ordinance were repealed and are, therefore, of no force.

LEXINGTON, KY.—The Bourbon County Home Telephone Company has increased its capital from $75,000 to $130,000.

DETROIT, MICH.—The Union Trust Company, as receiver for the Michigan Telephone Company, has filed a petition in the United States Circuit Court asking for authority to issue $50,000 of receivers' certificates, payable within three months from date and bearing interest at the rate of not more than 6 per cent. The certificates are to be made a charge upon the lines and property of which the trust company is appointed receiver and are to have priority over the mortgage of the Old Colony Trust Company. The money received will be used for such necessary improvements as are imperative at the present time, particularly for connecting different parts of the system which is now done by apparatus that did not pass under the control of the trust company when it was appointed receiver. It is thus intended to separate entirely the equipment of the old Detroit Telephone Company from that of the Michigan plant.

WESSON, MISS.—The Citizens' Telephone Company is sending out checks in payment of its 2 per cent. quarterly dividend.

FAYETTE, MO.—A meeting of stockholders of the Howard County Telephone Company will be held the 23d of May to vote on the increase of its capital stock from $10,000 to $24,000. C. E. Betts, secretary, and A. F. Davis, president.

STET, MO.—The Stet, Rockingham and Norborne Telephone Company held its annual meeting at Stet recently and increased its capital stock from $5,000 to $15,000. The following board of directors was elected: W. T. Bowles, J. J. Stratton, B. F. Clemens, George Rankin, C. S. Miles, David Hawkins, J. H. Bowman, James Craig and J. H. Shirkey.

HUNTINGTON, PA.—The Huntington and Clearfield Telephone Company, which is preparing to extend its business on a very large scale, has increased its capital from $300,000 to $500,000.

WAYNESBURG, PA.—A movement is on foot to incorporate the Standard Telephone Company, now owned by E. B. and James R. Throckmorton. The capital stock will probably be $100,000, and each share of stock must pay $20 into the surplus fund. The Standard has about 1,100 telephones in Waynesburg and vicinity, and is one of the best paying plants in Greene County. The Standard company is negotiating for an entrance into Pittsburg. The company already has a line to Washington and McKeesport, and is about to enter Wheeling, W. Va.

FRANCHISES

HORNICK, IOWA.—The Iowa Clark Automatic Telephone Company of Sioux City, and the Peiro Telephone Company have been granted franchises for a local exchange.

RADCLIFFE, IOWA.—The Radcliffe Telephone Company has been voted a franchise.

SHELBY, IOWA.—The Shelby Independent Telephone Company has been granted a franchise at Minden.

SIOUX CITY, IOWA.—A petition, signed by the Sioux City Stock Yards Company and almost every livestock commission firm, as well as the Cudahy Packing Company, asking the city council to act favorably upon the request of the promoters of the Independent Telephone Company for a franchise, has been filed in the office of City Clerk Kloster. The petition asks the council to submit the question to the people as provided by law. It is asserted by the petitioners that the best interests of the city will be subserved by the construction and equipment of a modern, up-to-date Independent telephone exchange, one which will grant connections to Independent toll lines seeking admission to the city.

SPENCER, IOWA.—The Spencer Citizens' Telephone Company has been voted a local franchise.

SOUTH LYON, MICH.—South Lyon has granted a franchise to the Livingston Home Telephone Company. The lines of the company at present run from Howell west to Lansing and east to Brighton, and will now be extended to Plymouth via South Lyon.

FULTON, MO.—The Boydsville and Fulton Telephone Company has asked for a franchise to set poles in the city. A petition, signed by E. R. Humphreys, president; C. W. Howison, secretary; George W. Scott, Obe James and C. E. McCormick, managers, has been presented to the city council.

WEST POINT, NEB.—The Cuming County Independent Telephone Company has presented a petition to erect poles and string wires in this city.

TRENTON, N. J.—Representatives of the Inter-State Telephone Company are seeking the right of way for the erection of poles between Brighton and Salem.

HAVERSTRAW, N. Y.—E. H. Snedeker, of this place, has filed applications for franchises in Haverstraw, Congers, Garnerville and Stony Point. A company is being formed by New York capitalists to be known as the Merchants' Telephone and Telegraph Company. Negotiations are under way to purchase the electric light plants at Haverstraw by the above company, whereby the cost of construction will be greatly reduced.

LEWISTON, N. Y.—The town board has granted a franchise to the Home Telephone Company.

SANTA ANA, CAL.—The Chamber of Commerce has passed a resolution signed by the full board indorsing the efforts of the new Home Telephone Company to establish a competing system here and asking the board of supervisors to prepare a reasonable franchise and put it up for sale to the highest bidder that the new company may be given a chance to get to work as speedily as possible.

WAYNESFIELD, OHIO.—The Waynesfield Telephone Company has secured a franchise at St. Johns.

TYNDALL, S. DAK.—The Lesterville town board has granted the Farmers' Exchange Company of Tyndall a franchise to put in a local system.

GLIDDEN, WIS.—The Glidden Telephone Company has been granted a franchise to build and operate in this town. The company consists of

THE WEEK'S MESSAGES—Concluded.

J. W. Hoops, George L. McCurdy, W. L. Schuppert and David Bodway, all of this place. They will build several exchanges in Ashland county and a toll line.

RATES.

WARREN, OHIO.—The Warren and Niles Telephone Company has raised its rates on new contracts to $12 to $18 a year for residences.

BILLINGS, MONT.—A rate war has been commenced in this city. The Montana and Wyoming (Independent) Telephone Company charges $1.50 to $2 per month for service. The Rocky Mountain Bell Telephone Company has now reduced its rate from $2 to $4 per month to $1 per month. The new contract which it is putting out calls for a two-years' subscription, no charge to be made for the first year and $2 per month for the second year. The Independent Company will probably retaliate.

BIRMINGHAM, ALA.—The People's Home Telephone Company has again asked the city council to grant it the privilege of increasing the rate for telephone services.

MOORESVILLE, IND.—The Mooresville Telephone Company has elected the following directors: D. B. Johnson, O. H. Mills, A. L. Wheeler, Frank E. Carlisle, O. P. Macy, H. C. Scearce.

RUSHVILLE, IND.—The Rushville Co-operative Telephone Company has re-elected John Kelley and John H. Frazee as directors, and has elected Owen L. Carr, succeeding S. M. Poston.

ABILENE, KAN.—The Union Telephone and Telegraph Company held a meeting here and elected C. P. Dewey, of Manhattan, president; A. T. Rodgers, of Beloit, vice-president; C. L. Brown, of Abilene, secretary; J. W. Smith, of Minneapolis, treasurer; A. T. Rodgers, C. L. Brown, J. W. Smith, C. P. Dewey and F. W. Dougherty, directors. The company has been incorporated and will make traffic agreements with the Home Telephone Company of Kansas City, Mo., and the Western Telephone and Telegraph Company, which will construct copper-metallic lines from Kansas City to Topeka. The Union Company will then construct a first-class copper-metallic circuit from Topeka to Abilene.

LEXINGTON, KY.—The Fayette Home Telephone Company has elected new officers. The resignation of Desha Breckenridge as president was accepted, and George S. Shanklin was elected to the office. All of the other officers were re-elected. Thomas A. Combs, vice-president; Jouett Shouse, secretary, and J. Will Stoll, treasurer.

BELLEVUE, PA.—The Bellevue Home Telephone Company held its annual meeting and elected the following board of directors: H. C. Stahl, B. F. Bell, C. W. Bell, D. Calhoun, F. A. Knapp, W. M. Haliday, C. R. Calaghan. The secretary's report showed 464 telephones now connected and in use and the company in a very prosperous condition.

ECONOMY, PA.—The Economy Telephone Company has elected Francis Lint as manager.

COMBINATIONS.

WINCHESTER, KY.—The Old Kentucky Telephone and Telegraph Company of Winchester, represented by Colonel J. W. Chambers, has bought the telephone franchise at Richmond.

VERSAILLES, O.—The Home Telephone Company has recently been purchased by the Greenville Home Telephone Company, A. J. Vernier, manager of the Independent Construction Company of Archbold, O., acting for the Versailles Home Telephone Company.

PERSONAL

CHICAGO, ILL.—President Fish, of the American Telephone and Telegraph Company, has nominated two members of the Illinois bar to succeed General Sabine—William Wheeler, of Holt & Wheeler, for president of the Chicago Telephone Company, and Mr. Richardson, now general counsel of the company, to be president of the Central Union Telephone Company.

PARIS, KY.—Newton Mitchell has been appointed manager of the Bourbon Home Telephone Company.

CRESTLINE, OHIO.—C. E. Morkle has been appointed manager of the Crestline Telephone Company by General Manager C. R. Callaghan, of Bellevue.

UNDERGROUND

MUSCATINE, IOWA.—An ordinance providing for the placing underground of all telephone wires in the city of Muscatine has been given first reading in the city council.

BROCKPORT, N. Y.—The Westchester Telephone Company has asked the board of trustees for a permit to place conduits on certain streets.

MISCELLANEOUS

DAVENPORT, ILL.—The Johnston County Telephone Company has filed an action in equity asking that an injunction be issued against the Union Electric Telephone and Telegraph Company, restraining it from disconnecting the plaintiff's toll lines from its telephone exchange and business at Davenport, which the defendant company threatened to do. The Johnson County Company claims a ten-year contract. Judge Bollinger ordered a temporary injunction.

FREEPORT, ILL.—The location of the Stephenson County Telephone Company has been changed from Chicago to Freeport; directors increased from three to seven.

GIBSON, ILL.—The Gibson Telephone Company, of Gibson, has changed its name to Grangers' Mutual Telephone Company.

MOUNT VERNON, ILL.—The Tri-County Telephone Company held a meeting at the office of Kirby Smith in this city recently to arrange with the Duquoin and Jackson county lines for a mutual interchange of business.

BUFFALO, N. Y.—The first papers of the voluntary dissolution of the Frontier Construction Company, organized to do the building for the Frontier Telephone Company, have been filed in Albany.

CLEARFIELD, PA.—The exchange of the Huntingdon and Clearfield Telephone Company has been opened for business.

WAYNESBURG, PA.—The Standard Telephone Company has entered into a traffic agreement with the National Telephone Company of Wheeling.

New Construction in the Field

SANFORD, FLA.—The Sanford Long Distance Telephone Company is constructing a line between Winter Park and Sanford.

KEWANEE, ILL.—W. H. Hibbs, of Wilkesbarre, Pa., is in Kewanee, and announces the purchase of the franchise granted to the American Electric Telephone Company by the city council last winter, the new company to be known as the Kewanee Home Telephone Company, and it will install a complete plant with underground conduits in the business districts at once.

SPRINGFIELD, ILL.—The Independent State Telephone Company of Springfield will connect with the Central Illinois system in Lincoln.

VIRDEN, ILL.—The Farmers' Mutual Telephone system has secured a franchise and may erect a telephone system in Virden. The promoters of the enterprise are S. S. Huber, I. H. Harshbarger, S. S. Brubaker and H. Ebers.

HANOVER, IND.—The Madison Telephone Company is putting in an exchange here. There are fifty local subscribers, and it is expected rural connections will increase the number to 100.

McCALLSBURG, IOWA.—The McCallsburg Mutual Telephone Company, under the management of J. W. Hardin, is constructing many new lines.

ROCKWELL, IOWA.—The Western Electric Telephone Company will establish an exchange here.

ROWAN, IOWA.—The Rowan Rural Telephone Company has received supplies preparatory to beginning the erection of about forty miles of line this summer.

TOLEDO, IOWA.—The Commercial Telephone Company will increase its lines and better its service very materially at once, owing to the fact that the Tama exchange has been sold to Mr. C. W. Smith, of Tama. Mr. Smith will invest the needed capital in Tama to meet the demands there. The contract between the Toledo and Tama companies calls for a mutual exchange.

BELOIT, KAN.—The Solomon Valley Telephone and Telegraph Company of Beloit is constructing many lines radiating from here. All toll lines will be reconstructed and made metallic. It has purchased a new section of switchboard and telephones from the American Electric Telephone Company, and it has also ordered cable for the Cawker exchange, which is to be rebuilt and country line extensions made.

CLIFTON, KAN.—The Clifton and Vining Telephone Company is building a rural telephone line south from town.

THE WEEK'S MESSAGES—Concluded.

DOWNS, KAN.—The Downs and Western Telephone Company has installed a new 200-drop Kellogg switchboard here.

SALINA, KAN.—The Salina Telephone Company is building a metallic circuit to Brookville. Already there is a metallic circuit beyond Brookville to Ellsworth.

LONDON, KY.—N. Starkey has sold his interest in the London Telephone Company for $10,000, and will construct a line from Pineville to connect with the Harlan Telephone Company.

SAGINAW, MICH.—The Valley Telephone Company will this summer expend about $10,000 in Flint stringing cables and otherwise improving the service, and expects to expend in that vicinity about $25,000.

VERNON, MICH.—The Independent Telephone Company, of this village, is arranging to establish a local exchange.

CLEARWATER, MINN.—The Clearwater Telephone Company, recently organized, will supply the towns of Clearwater, Hasty and Silver Creek with service. The company is capitalized at $10,000, and its rate will be 75 cents and $1.50 per month. The officers are G. P. Bontwell, president; W. F. Shattuck, vice-president; W. Frantzen, secretary; C. D. Whitemore, treasurer, and J. H. Whitney, manager.

FERTILE, MINN.—The council has granted a franchise to R. A. DeMars, of Hallock, Minn., to put in a telephone system to be in operation by July.

MINNEAPOLIS, MINN.—The Twin City Telephone Company has begun the erection of its new North Minneapolis exchange. The plans call for a handsome structure, to cost $10,000.

STOCKHOLM, MINN.—John Ecklof, president of the Stockholm Telephone Company, is contemplating the extension of the line from Lamson to Bear Lake.

CARROLLTON, MO.—The Missouri Valley Telephone Company is building three lines west and northwest of the city, and three lines east and northeast.

DONIPHAN, MO.—T. L. Wright, the proprietor of the Doniphan Telephone Company, has decided to enlarge his system to take in the whole of Ripley county.

ALBANY, N. Y.—The Home Telephone Company, of this city, has received the contract for furnishing all the schools of the city with telephones and installing a central board in the office of Superintendent Howe in the Union School building.

BOLIVAR, N. Y.—The Bolivar Telephone Company will build a five-mile extension to its lines. F. O. Clapp, of Cuba, has the contract for constructing the addition.

BUFFALO, N. Y.—The Frontier Telephone Company is extending lines to Blasdell, and connections will be made with the Haines Telephone Company.

CUBA, N. Y.—The Cuba Telephone Company is planning to build several miles of extensions to its lines this year. The company now has 225 instruments connected up with its central office.

HAMMONDSPORT, N. Y.—Harry Niver is about to construct a telephone line from Pleasant Valley to this village. It will have connection with the Mount Washington and West Hill lines. It is understood that H. L. Brush, of Pulteney contemplates constructing a line from Pulteney to connect with the West Hill line. G. T. Conine will soon extend his rural lines from Prattsburg to this place.

PHOENIX, N. Y.—The Ontario Telephone Company will commence the construction of a local system in this village soon.

WOLCOTT, N. Y.—Arrangements have been made by Arthur Fish and E. T. Phillips, of Wolcott, for building a telephone line from here to Butler Center and South Butler. It is expected that lines will then be built to Huron and Lake Bluff on the north, and Red Creek on the east.

RALEIGH, N. C.—The Inter-State Telephone Company is constructing lines to Loesville and Rogers' Store. These are the first of many county lines that this company will build this summer, costing over fifty thousand dollars.

KENTON, OHIO.—Kenton capital will soon build 200 miles of telephone toll lines in the State of Texas. The local organization, known as the Orange Telephone Company already has two exchanges in operation—one at Orange and the other at Paris. The new line will connect Orange, Paris, Texarkania, Sherman, Dallas and the principal cities of the State. It will be a copper-metallic circuit and will have about 500 miles of tributary connections.

SCIO, OHIO.—The Harrison County Telephone Company is preparing to build a toll line from Scio to Bowerston, where an exchange will be installed the coming summer. The company also expects to string copper circuits throughout its present system of toll lines which will cover 35 miles. The present switchboard capacity at Cadiz will have to be enlarged in the near future.

INDIANA, PA.—The Indiana Telephone Company is preparing to make extensive improvements on its line between Indiana and Punxutawney. A metallic line between these two points will be installed, giving a double line, one for local purposes and the other for direct service. The new line will be over a different route from Marion to Marchand, and will be shorter than the present one. The company also expects to erect a metallic line this summer to Saltsburg.

MERRILL, WIS.—The Merrill Telephone Company will rebuild its entire system in this city this summer and will expend between $15,000 and $20,000 in the reconstruction.

SERMONS BY TELEPHONE

THE latest town to enjoy the notoriety of a sermon by telephone is Madison, Mo., according to the newspapers of that State. The preacher who introduced the novelty into the State was the Rev. J. W. Kimbrell, of the Methodist denomination.

It was a rainy Sunday—in fact, it had been raining for nearly a week, so the story goes—and the minister was discouraged. The larger portion of his flock were country folk—farmers living miles from the church. The roads were almost impassable, and the preacher knew the attendance would be very slim. He wanted to do his duty by his fellowmen, and he had a bright idea. Going to the manager of the local telephone exchange, he said:

"I want to preach to the country people who cannot attend church to-day. How many families can I reach by telephone from this office?"

"About two hundred," replied the manager.

"Well, is there a way by which I can talk to all these at one time?"

"Certainly," replied the manager. "I can arrange connections in a booth here, and you can preach to all my subscribers."

The subscribers were notified that at 11 o'clock their telephone bells would ring, and if they wanted they could hear the regular church service without leaving their homes. The preacher prepared a special sermon, taking as his text "What Hath God Wrought?" He delivered a touching and powerful discourse on the wonders of present day science, and he and his hearers now regard the telephone almost with awe.

TRADE NOTES

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, has set the pace for catalogue makers in its new "Art Souvenir," just fresh from the press. All telephone men will be presented with one upon request. The new book is handsomely printed and elaborately illustrated, every page being ornamented with rare and expensive designs. It will appeal to all who see it, as the product of a firm that issues nothing but the best.

THE AUTOMATIC ELECTRIC COMPANY has begun the shipment of automatic telephone equipment to the Dayton Home Telephone Company of Dayton, Ohio, and the Citizens' Telephone Company of Grand Rapids, Mich. The Dayton Company will begin business with 6,000 stations, and its ultimate capacity will be 19,000. The Grand Rapids Company will have a present installation of 5,000, with an ultimate capacity of 19,000. Both of these companies have erected new buildings which were designed especially for the automatic exchange.

The recently organized Commonwealth Telephone Company of Waterloo, Iowa, has placed an order with the Automatic Electric Company for the equipment of 1,200 stations, with a capacity of 10,000. An order has also been given by the Wettstein Construction Company, which will build the new exchange in Burlington, Iowa. This order calls for the present equipment of 800 stations and an ultimate capacity of 10,000.

The American Telephone Journal

VOLUME VII. SATURDAY, MAY 9, 1903 NUMBER 19

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TELEPHONE EXCHANGE ENGINEERING—ARTICLE IX

By Ray H. Manson, Albion D. T. Libby and Chas. A. Simpson.

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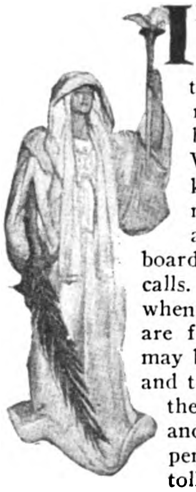

IN the toll line circuit (Fig. 4) all the apparatus on the left of the dotted line is located at the toll board, and all on the right at the first position of the multiple common battery board. Each line terminates in a drop and jack in the face of the toll board. These toll lines are all wired through a key. When these keys are normal the drops at the toll board indicate the calls. At night, when the toll calls are few, these keys may be thrown over and transfer calls to the multiple board and save the expense of a night toll operator. The drops are constructed so that when the shutter falls a local battery circuit will be closed through a relay, which will close a circuit through a pilot lamp and a buzzer or bell. The buzzer is wired through a switch so that it can be thrown out.

Fig. 5 shows the toll to toll cord circuit and the toll operators' circuit, with a transmitter cut-out key, *F*. Each cord circuit has two (2) keys—a ringing and a listening key for the front cord, and a ringing key for the back cord. The toll to toll cord circuit is used to connect only toll lines together. If the toll operator has two toll stations connected with this cord and she wants to know if they can hear each other plainly, she must be able to listen in without creating any noise on the line to disturb the parties talking. She can do this by simply throwing the key *F* before listening in, which opens the battery circuit through the transmitter and primary of the induction coil, and thus preventing the transmitter from taking up noises in the room.

In order for the toll operator to be able to connect a toll line with a common battery line, two other circuits are necessary, viz.: Toll to Local Cord Circuit, Fig. 6, and Two Way Toll Trunk, Fig. 7.

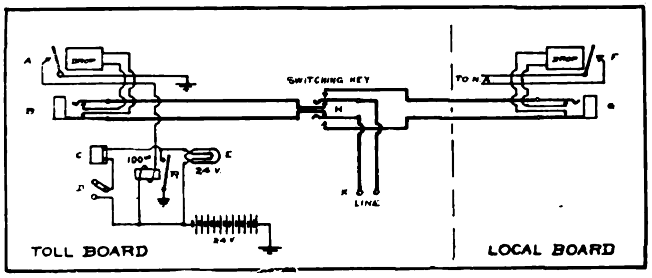

FIG. 4.—TOLL LINE CIRCUIT.

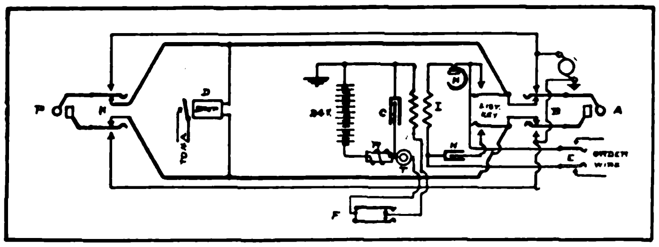

FIG. 5.—TOLL TO TOLL CORD CIRCUIT.

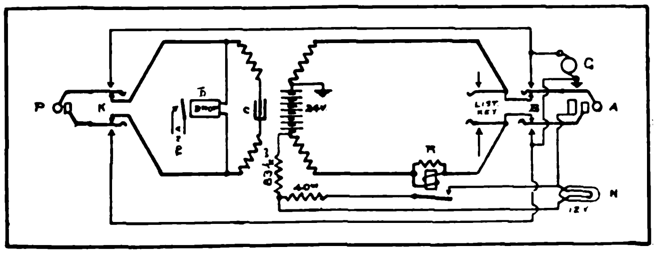

FIG. 6.—TOLL TO LOCAL CORD CIRCUIT.

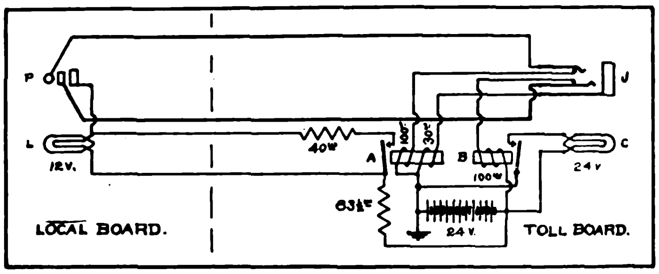

FIG. 7.—TWO-WAY TOLL TRUNK CIRCUIT.

The right of Fig. 6 is the same as the calling side of a regular common battery cord circuit, and is used for the common battery end. The other side is the toll end, and the repeating coil is closed through a two microfarad condenser, so that the bridged clearing-out drop will be thrown. The condenser has a high resistance (about 6,000 ohms) to ringing current, but very low resistance for talking current. Each cord circuit has a ringing and listening key for the common battery cord, and a ringing key for the toll cord.

All apparatus on the right of the dotted line in Fig. 7 is located at the toll board, and all on the left at the multiple board. The jacks and lamps are located in the face of the toll board. The plug *P* and lamp *L* are located in the plug shelf at the multiple board, and so distributed that each operator is able to reach one of these plugs.

A toll station will call on the toll board by ringing down the line drop *A*, Fig. 4. This will close a local battery circuit through the relay *R*, which lights the pilot lamp *E* and operates the buzzer *C* if the switch *D* is on, thus attracting the attention of the toll operator. The operator will answer with the rear plug *P*, Fig. 5. Upon inserting the plug in jack *B*, Fig. 4, the line drop is cut out of the line circuit. If the toll station calling wants another toll station the operator finishes the connection by taking the corresponding front plug and inserting it into the jack of the station called for and rings. If, however, a local common battery subscriber is wanted the operator pulls down the plug *P*, Fig. 5, and inserts plug *P*, Fig. 6, in jack *B*, Fig. 4, and with the corresponding front plug *A*, Fig. 6, plugs into the jack *J*, Fig. 7, at the same time depressing order wire button *E*, Fig. 5. The wires from order wire button *E* terminate at the head telephone of the operator, who is within reach of the plug *P*, Fig. 7, at the multiple board. When the plug *A* is inserted in the two-way toll trunk jack, *J*, the supervisory lamp *N*, Fig. 6, will light through the thirty (30) ohm winding of relay *A*, Fig. 7. Relay *A* will operate and throw the forty (40) ohm shunt around the lamp *L*. The toll

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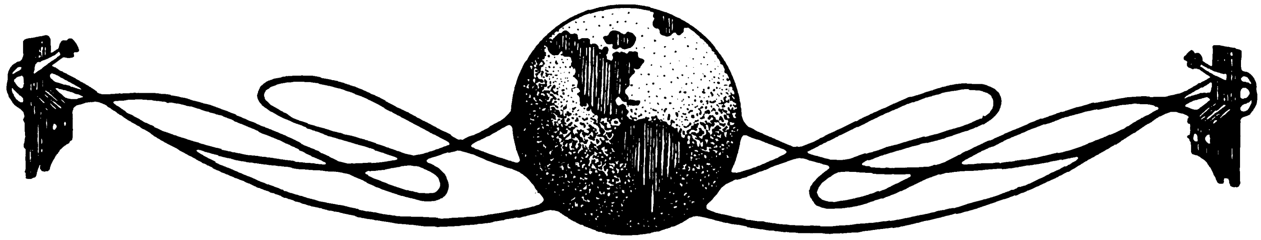
Editor's Note.—The first article in this series appeared in the issue of November 22. They will continue many months.

operator then tells the local operator, through the depressed order wire key, which common battery subscriber is wanted. The local operator inserts the plug *P*, Fig. 7, in the called for subscribers multiple jack, Fig. 1. The toll operator then notices her supervisory lamp *N*, and if it is still lighted she knows that the local subscriber is not busy and then rings with the key *B*, Fig. 6. When the local subscriber takes his receiver off the hook the supervisory lamp *N* will then be extinguished by the relay *R*, operating and throwing the forty (40) ohm shunt around the lamp. The local subscriber is now able to talk to the toll station.

When they are through talking the receivers are hung on the hook switch, and the toll operator rings down the clearing-out drop *D*, Fig. 6. As soon as the receiver at the common battery station is hung up the line circuit will be broken and current will cease to flow from battery out through repeating coil and relay *R*, Fig. 6. When the relay falls back the 40-ohm shunt is cut out and the supervisory lamp *N* will then light. The toll operator will then pull down both plugs since she has received the signal from each station to disconnect. When the plug is removed from jack *J*, Fig. 7, the relay *A* will fall back, which will light the supervisory lamp *L* at the local operator's position. The local operator upon seeing the lamp lighted knows the parties are through talking and will then pull down the plug.

If a common battery subscriber desires a toll connection, he calls up the local operator in the regular way. When the local operator learns that a long-distance connection is wanted, she inserts plug *P*, Fig. 7, into the calling subscriber's jack. Now, since, the subscriber has his receiver off the hook, current will flow from battery through relay *B*, Fig. 7, over the sleeve and back over the tip side of the line, Fig. 1, and then through the one-hundred (100) ohm winding of relay *A*, Fig. 7. Both relays *A* and *B* will be operated, which will not permit the supervisory lamp *L* to light, but will cause the line lamp *C* to light through the contact of the armature of relay *B*. When the toll operator sees the lamp *C* lighted she inserts plug *A*, Fig. 6, into jack *J* and finds out what toll station is wanted, and also what local subscriber is calling. The toll operator then tells the local party to hang up. The toll operator then pulls down her plug, and this gives the signal for the local operator to pull down plug *P*, Fig. 7. The toll operator will then insert plug *P*, Fig. 6 in jack *B*, Fig. 4, and ring the toll station by means of key *K*. When the toll party has been brought to the toll station the local subscriber is then called up and the connection completed as described above.



FOREIGN CURRENTS

By "The Arrester."

NEW telephone undertakings in Great Britain come in for a fair share of notice in the electrical journals. The construction work on the Swansea municipal system is so far advanced that it is expected that the service will be in working order by June next. The question of demanding intercommunication with the National Company's system has already been discussed, and it appears that the municipal system is entitled to claim intercommunication when it has half the number of subscribers that the National Company has. The municipal undertaking has already more than that proportion of orders for its service, but between orders and connected subscribers there is naturally some little difference. At Portsmouth the municipal system recently established is getting so many orders for its service that the committee of the town council having the matter in charge is getting positively worried by the unexpected demand for the service. Already 1,033 orders have been received in Portsmouth alone and 310 in the country districts. Apparently the Portsmouth municipal system was planned on such modest lines that it has been found necessary to extend the switchboards even before the system is fairly working.

London's Telephone System

The results of the first complete year's working of the Post Office London telephone system have lately been issued and are considered to present a very satisfactory state of affairs. The number of subscribers connected to the post office system has far exceeded what was anticipated, and the system is said to meet with the general approval of the public. One of the electrical journals evidently has a private opinion on this point and is unkind enough to hint at it by putting the words *is said* in the preceding paragraph in italics. However, it is making a pretty large claim for any telephone service to say that it meets with the general approval of the public. The total number of exchanges open is seven. Of these, the largest is in the heart of the city, or "downtown" portion of London, serving 6,110 subscribers, and the other six in the western and southwestern districts of the metropolis, the largest serving 570 subscribers and the smallest 140. The total number of subscribers' lines is 7,974 and the total number of stations connected 8,749. It is said that active work is proceeding at the Mayfair exchange—about which we had a few remarks to make a week or two ago—which it is hoped to open in the course of about eight months. Work is also under way on seven other exchanges, all in suburban or country districts, some being ten to fifteen miles from the centre. Evidently the post office telephone department is planning its London system on a broad and generous scale and there is apparently an opportunity for American manufacturers of up-to-date telephone apparatus.

Explaining Delays

The total expenditure on the system has been $5,335,000. It is explained that a considerable part of this amount is for plant and stores which have not yet been brought into use, but have been provided to meet the future requirements of the system. In addition to the 8,749 stations now in service, as noted above, there are about 2,000 orders on hand and from 150 to 200 new lines are being brought into use every week. In answer to a question in Parliament, asking why many subscribers who had ordered the service some months ago and when the telephone service for London was likely to be complete, the Postmaster General attributed the delay to the difficulty of obtaining rights-of-way from the local authorities, and he very wisely added that, in view of the increasing demand for new exchanges and of the rapid development of the existing exchanges, it was not possible to name any date for the final completion of the post office system in London!

Different Opinions

From this cautious and eminently statesmanlike reply it may be seen that the Postmaster General is a worthy son of his brilliant father, and takes a very different view of the probable development of telephony from that entertained by the municipal luminaries who have taken up the question and seem to be generally divided in their fears as to whether there is greater danger in holding on or letting go. There was recently a grand discussion at Hull on the question of proceeding or not proceeding with a municipal telephone enterprise that has been hanging fire for a long time. It was eventually decided to go ahead, but doubt was seriously expressed by some of the town councillors as to whether it was necessary to provide for so large a system as the capacity of two thousand subscribers which had been estimated for. Hull has a population of about a quarter of a million, and the suggestion that money might be saved by providing for less than two thousand subscribers gives some idea of the utterly unenlightened frame of mind of the British town councillor on the telephone question.

An Interesting Comparison

A somewhat interesting comparison between municipal telephony and the post office brand occurs on considering the figures for the London Post Office system given above in relation to the figures for the Glasgow municipal system, mentioned some weeks ago. The post office figures show an expenditure of $5,335,000 for 8,749 stations with 2,000 orders on hand, a considerable proportion of the capital invested being for surplus plant. Glasgow, in December last, had expended $1,100,000 for 7,400 stations, there being 1,260 orders on hand, and a considerable proportion of the capital expenditure being also attributed to surplus plant. Taking the figures as they read on the surface, the post office in London has expended on 18 per cent. more stations almost 400 per cent. more money than the Glasgow municipality. Put in another way, where the Glasgow municipality has spent—for the same showing in telephone stations—one dollar and eighteen cents the post office in London has spent within a few cents of five dollars. Put it whichever way you like, it is a startling difference and shows how difficult it is to make comparisons between telephone work in different places that shall have any intelligible meaning.

What the Reason Is

On the surface it would look as if either the post office in London had been wildly extravagant or the municipality in Glasgow economical beyond even Scotch ideals. At first sight the difference between the two places might not be considered to be so very great. Glasgow is a large city; indeed it boasts of being the "second city in the Empire," coming next to London in population and area. Nevertheless it is not a quarter the size of London, either as regards population or area, and in this fact lies one explanation of the great difference. The immense area of London results in a very long average subscriber's line and in an enormous trunk line plant, and underground construction in London is extremely costly owing to the density of the traffic and the solid character of the street pavements. Labor is, of course, dearer in London than it is in Glasgow, as it is dearer in New York than in other American cities, and there are various other items that are more costly in the metropolis than in the big city on the Clyde. Still, even when liberal allowance has been made for the much greater scale of operations, for a greater proportion of unused plant and for higher costs generally, it yet remains difficult to explain a ratio of four to one. It is known, of course, that the post office has adopted modern central energy working throughout its system, whereas the Glasgow municipality went back to the last century and fished up the call-wire system from the relics of the past. This was done presumably from motives of economy, and such retrograde methods give some light on the engineering policy adopted at Glasgow, which seems to have been the dangerous one of saving in first cost at the expense of the future. This also helps to explain the great difference between the cost of the London and Glasgow telephone system. That Glasgow, if the municipal system survives, will before long require to convert it to central energy working is a probability that the American manufacturer should keep in mind.

Absurd Objection of Authorities

In dealing with the London telephone service the Postmaster General referred to the difficulty of getting rights-of-way from the local authorities. The obstruction offered by the British local authorities to the building of telegraph and telephone lines often reaches an absurd point. A case has just occurred in the town of Fleetwood, in Lancashire, where the local authorities refused to allow the Postmaster General a right of way from the railway to the new post office unless he put up iron poles of a certain pattern; each pole to be equipped with two 16-c. p. lamps, and to be painted and repaired every year. Mr. Chamberlain not only declined these conditions, but delivered an ultimatum to the effect that unless they were withdrawn he would cut off telegraphic communication with Fleetwood on a certain date. Whereupon Fleetwood promptly climbed down, and a compromise is to be arrived at. Telegraphy and telephony on a large scale are not likely to be done without wires for some time to come. The whole community benefits by telephonic and telegraphic communication, yet many individuals, and especially petty officials, offer the most unreasonable opposition to the placing of the wires that make that communication possible. The Fleetwood incident ought to be a good lesson.

ELECTRICAL MEASUREMENTS—ARTICLE XI.

By Arthur Vaughan Abbott.

THE various galvanometers described are built to secure maximum of sensitiveness, because for many measurements the utmost delicacy is required, still cases occur in which such instruments may be too sensitive for the purpose, and some means must be arranged whereby sensitiveness can be varied. In the D'Arsonval instrument, described upon page 101 of The American Telephone Journal, it is easy to provide two or more tubes containing suspensions of different degrees of sensitiveness, any one of which may be instantly substituted for another, and thus the galvanometer given very great range. But in other types of instruments this is impracticable, and sometimes with the D'Arsonval, after the instrument is properly set up and adjusted, it is inconvenient to exchange tubes. The most common means of varying the sensibility of a galvanometer is to provide it with a Shunt, or in other words, a portion of the current which would traverse the galvanometer, if it were connected directly in series with the circuit to be measured, may be deflected and carried around the galvanometer by means of another conductor. If the resistance of this conductor is known it is easy to calculate the effect which it will produce upon the galvanometer, in reducing the current that traverses that instrument, so that if both the resistance of the galvanometer and that of the shunting conductor be known it is easy to calculate what the deflection of the galvanometer *would have been, provided* all current traverses its coils. The theory of the shunt is illustrated in Fig. 1. In this illustration G is the galvanometer and S the shunt, and let the respective resistances of the galvanometer and shunt be represented by the corresponding letters. Further, let I be the current in the circuit outside of galvanometer shunt, i the current in the galvanometer, and i^1 the current in the shunt, then obviously $I = i + i^1$. As the electromotive force is the same in both branches, the respective currents will be inversely proportional to the resistances of each branch and hence $\frac{i^1}{i} = \frac{G}{S}$ and $i^1 = i \times \frac{G}{S}$. From these relations it is easy to deduce that $I = i \times \frac{G + S}{S}$. Knowing the deflection given by the galvanometer with a unit current, the current i is easily deter-

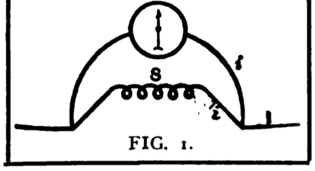


FIG. 1.

Editor's Note.—The first article in this series appeared in the issue of January 17. They will continue for about a year.

mined from the observed deflection. From the known resistance of G and S, I is easily calculated, and hence the deflection upon the galvanometer scale that *would be produced* with the current I, if the shunt were omitted, which evidently is the deflection given by the current i multiplied by the factor $\frac{G + S}{S}$.

This factor is termed the multiplying factor of the shunt and is often called M. For example: Suppose a galvanometer having a resistance of 6340 ohms be shunted with 10 ohms and a deflection of 125 divisions on the scale is found, what would be the deflection of the galvanometer if the shunt were omitted?

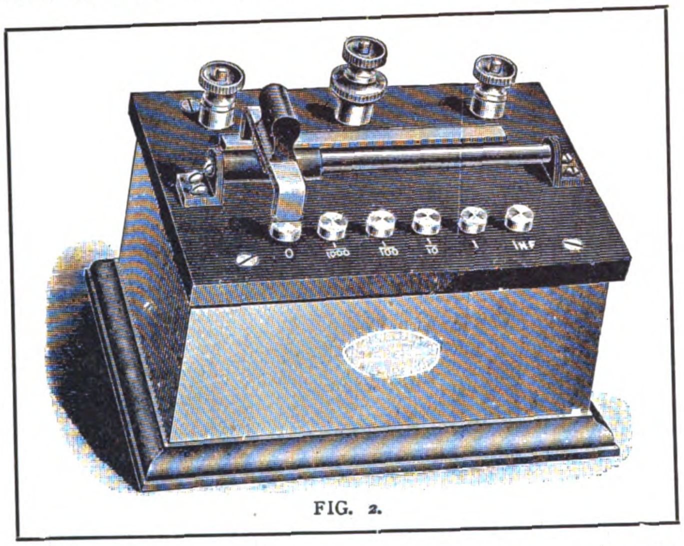


FIG. 2.

$$125 \times \frac{6340 + 10}{10} = 125 \times 635 = 79375$$

In this example $M = 635$. So in all cases the galvanometer deflection, when used with a shunt must be multiplied by the proper factor in order to obtain the true readings. It is very evident that any resistance may be used to shunt a galvanometer, though for rapid work it is best to use easy multipliers, such as multiples of 10, in order to save difficulty of calculation. Galvanometer shunts simply consist of carefully prepared coils of wire, which are mounted in an insulating box to which proper terminals are attached, and arrangements made so that any coil may be cut in or out of circuit at pleasure. One of the best forms of shunt is shown in Fig. 2, which is equipped with three coils, giving respectively a multiplying power of 10, 100 and 1000. In Fig. 3 the circuits of the shunt box are given. It is hardly necessary to state that every galvanometer must be provided with its own particular shunt, unless the galvanometer resistance is carefully adjusted to be some exact number of ohms, which will match a universal shunt prepared upon a decimal system. In making tests with sensitive galvanometer it is always desirable to have a shunt in circuit, because in making insulation measurements particularly it often happens that the actual insulation is much less than the expected value, due to a short circuit or some similar cause, and if the shunt were omitted the galvanometer would be subjected to so powerful currents as in many cases to be irretrievably injured.

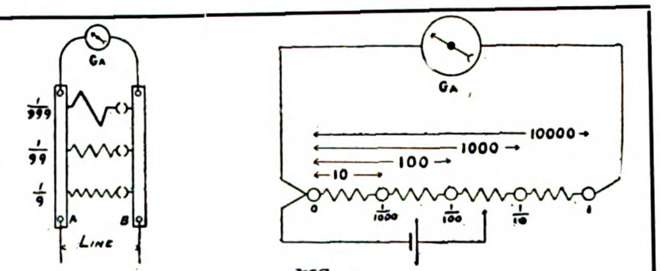


FIG. 3.

In a reflecting galvanometer the angle of maximum sensitiveness is the largest deflection that can practically be obtained. Under any circumstances the deflection can be but a few degrees, so that the true angle of maximum sensitiveness is rarely ever reached. Sensitiveness may be increased by the method of what is termed "*Inferred zero*." Suppose the controlling magnet to be moved, so that the needle and its mirror are turned away from the scale to a considerable distance. Evidently without increasing the length of the scale the angle through which the needle may swing and a reading made, is largely increased. For example: Suppose the needle to rest normally on the zero on the scale, and that the length of the scale is sufficient to permit a reading of say 300 or 400 divisions. Suppose a given current to produce a deflection of 300 divisions. If current be increased 1 per cent. the deflection will be $\frac{300 \times 101}{100} = 303$, an increase of 3 divisions. Now let us assume that the needle be turned so it will rest 400 divisions away from the scale zero, and that the current is sufficient to produce a reading of 300 on the scale. The actual deflection will therefore be 400 × 300 or 700, and an increase in the current of 1 per cent. will increase the deflection to $\frac{700 \times 101}{100} = 707$, or an increase of 7 divisions instead of 3 divisions. Thus the apparent sensitiveness of the instrument is more than doubled. Another use of the "Inferred zero" is found in making tests for insulation or capacity, when the current through the galvanometer is so great as to throw the spot of light entirely off the scale. By adjusting the needle a given number of divisions away from the beginning of the scale, it is always possible to get a very largely increased reading.

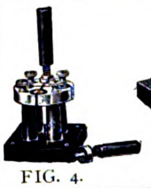


FIG. 4.

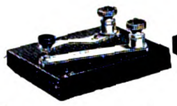


FIG. 5.

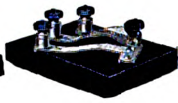


FIG. 6.

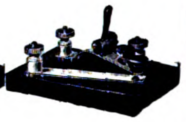


FIG. 7.

In order to use a galvanometer rapidly and safely it is desirable to have a number of switches whereby the various circuits can be rapidly and quickly manipulated. Such switches are termed "keys" and are illustrated in Figs. 4 to 9 inclusive. Fig. 4 is a commutator key. This consists of 4 segments which may be united by means of a plug and thus the direction of a battery current quickly reversed. Fig. 5 is a simple form of an ordinary strap key. In Fig. 6 the strap key is shown with an upper contact whereby the galvanometer may be constantly kept short circuited, and thus protected from accidental currents which might otherwise injure it. In Fig. 7 a similar key is shown, but arranged for a double circuit. In Fig. 8 what is called a combination key is shown. In this switch a double circuit key is presented, so designed as to short-circuit the galvanometer when not in use, and to provide a double circuit key and a battery changing key. In Fig. 9 a discharge key is given, the use of which will be more fully explained in treating of measurements for capacity. This key is furnished with two buttons. When the key is depressed the battery is allowed to flow into the cable. After the battery and cable are thus connected for a given number of seconds the left-hand button is touched and the key opens the battery circuit and insulates the cable. By touching the right-hand button the cable is discharged through the galvanometer. While such pieces of apparatus are pre-eminently convenient and desirable in making all sorts of electrical tests, they are not, in the forms here represented, absolutely essential, and it is very evident that any ingenious mechanic will readily see a way of improving apparatus that will equally answer the purpose.

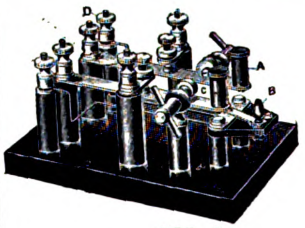


FIG. 8.

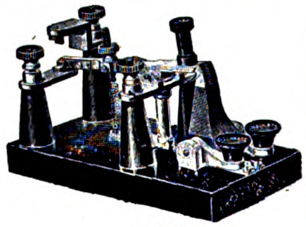


FIG. 9.

TROLLEY CURRENTS DESTROY SWITCHBOARD

By Earl F. Edmunds.

The central office plant of the Independent Telephone Company, at Little Falls, N. Y., was entirely destroyed by fire on April 27th, in a most unusual manner. The fire was caused by a high tension current that had been turned on for a test by the local trolley company, which had just entered the town, the first electric railway ever constructed in Little Falls. Fifteen minutes after the railway current had been turned on the telephone switchboard and exchange appeared as shown in the photographs. The trouble was caused by the gross negligence of the street car company. One of its span wires, which support the trolley line, was allowed to rest on a messenger wire, supporting one of the telephone cables. The insulation of the span from the trolley wire was defective in some way, for as soon as the current was turned on, it found its way over the span wire to the messenger wire, and from there to the lead sheath of the telephone cable and then to the switchboard through the distributing frame, etc. The current didn't go through the protectors, but over the sheathing, thus finding its way to the switchboard. Not a single wire in the cable or any of the outside wire plant or sub-stations was damaged. The lead sheath of the cable was grounded to protect the plant from just such accidents, but the grounding failed utterly of accomplishing its purpose. Fifteen minutes after the fire started, it was extinguished, but even in that short space of time at least $10,000 damage was done.

The toll board, which was on the other side of the room from the main switchboard and connected thereto by a number of trunks, was damaged slightly, but only from the flames. The power plant, consisting of charging and ringing machines in duplicate, duplicate storage batteries, and a fine power board, was very badly damaged, and may have to be replaced.

Six days after the fire, the Kellogg Switchboard and Supply Company had a temporary switchboard in Little Falls equipped with 100 lines and 20 toll lines. The company is now giving service with this board, having put five or six subscribers on each line.

The Interstate Company has ordered a new switchboard from the Kellogg Company, which will be shipped in two weeks. It will be of the same capacity and equipment as the old board.

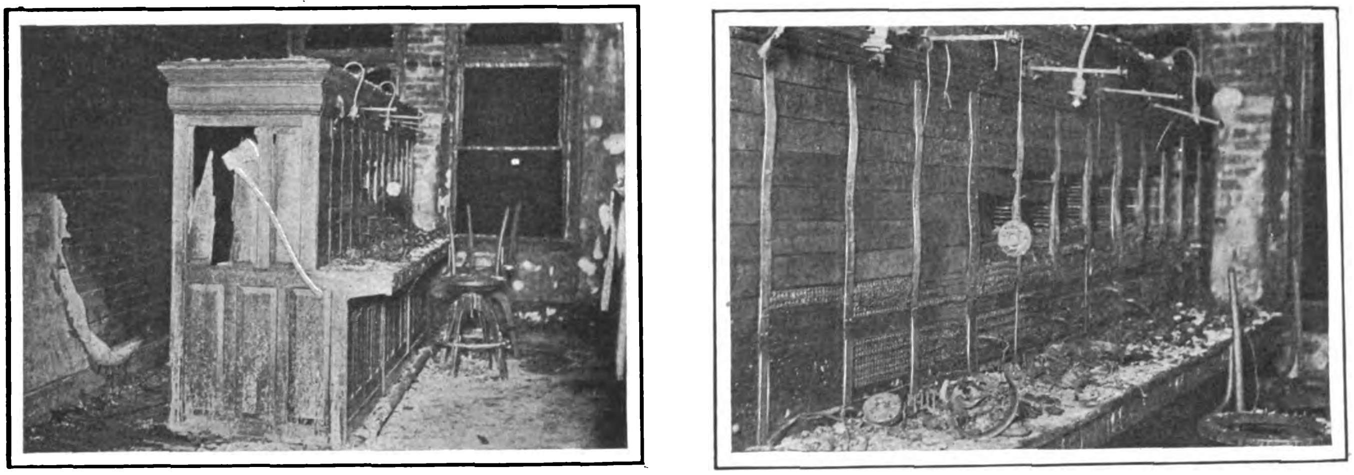
The company's exchange is located on the top floor of a three-story brick building with a granite front. Since the accident, there has been a good deal of talk of building a new exchange building exclusively for the company's purposes.

Little Falls has a population of less than 10,000, and has four banks. The Interstate Telephone Company began business there about six years ago. It installed a magneto system, that even in those early days of Independent telephony was more antiquated and poorly constructed than usual. So far as service was concerned, the Bell company was far in the lead, although its extremely high rates gave the Independent company a foothold in the town. Until about two years ago, however, the company had not succeeded in increasing its subscription list above 125, which was about the same number the Bell had. The Bell company in the meantime had cut its rates, and although it operated a magneto system also, it gave a greatly superior service. This was the situation in 1901. The outlook for the Interstate Company was dark. Under the circumstances, it couldn't compete with its rival successfully, and it became apparent to all interested that something must be done.

There were two men in Little Falls, however, who had confidence in the ultimate success of the proposition. These men, Rugene Walrath and George H. Tuttle, believed firmly that with proper management the company could be made a paying proposition. Accordingly, they purchased the property, and incorporated the reorganized company with a capital of $15,000.

The first thing they did caused prophecies of dire calamity from the original owners. They ordered a Kellogg switchboard equipped for 480 lines and having an ultimate capacity of 1,000. They then installed a complete modern common battery system, and began an active campaign for business.

In less than one year, the excellent service furnished had filled the switchboard equipment, and another section of 160 lines was added, making a total capacity of 640 equipped lines. At the time of the fire the company had 600 subscribers, while the Bell has but 160, and still uses its old magneto board.

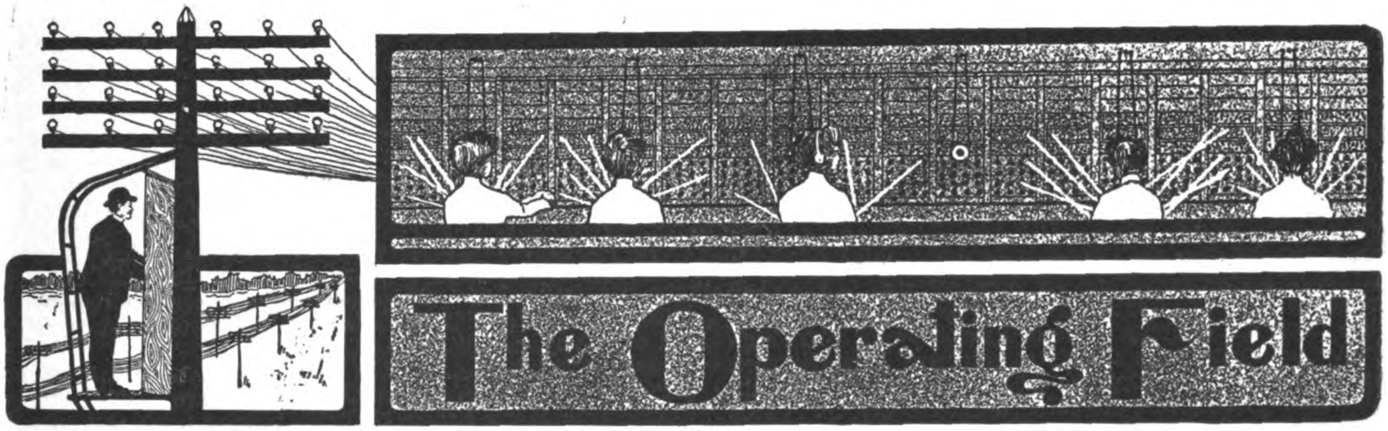


TWO VIEWS SHOWING THE APPEARANCE OF THE SWITCHBOARD AFTER THE FIFTEEN MINUTE FIRE.

The officers of the company express the opinion that the disaster was perhaps a very good thing. They expect that as soon as they get in shape again, the company will enjoy a season of prosperity unprecedented. Many subscribers who had been lukewarm in their support of the company have learned to greatly appreciate the service, since they have been deprived of it. The company has a very extensive toll service to all the surrounding towns, in many of which it operates exchanges. Of course, subscribers couldn't obtain these toll connections after the fire, and they then learned how valuable the service was to them.

All who wanted toll connections were obliged to go to the exchange, and there talk through one of a dozen temporary telephones that were put up on the walls of the room. In many cases, the conversations had to be repeated by the toll operators. Until the temporary board was placed in position, the operating room of the company was full of subscribers using these temporary toll telephones.

The officers of the Interstate Company at present are: Rugene Walrath, president; John Hurley, vice-president; George G. Hakes, secretary and manager, and George D. Smith, treasurer. The directors are the above with the exception of Mr. Smith, and George H. Tuttle, Alfred P. Roth, Walter Stafford and G. R. Beardsley.



IMPORTANT INDIANA INDEPENDENT AGREEMENT.

By L. B. Sisson, *Special Correspondent.*

As the result of a conference between W. W. Harbaugh and W. T. Mallot, of Mallot, Ind., the owners of the Sullivan, Ind., telephone exchange and the representatives of about 20 rural lines in the vicinity of Sullivan, an agreement was reached for interconnection between all of the lines. This agreement will mean that 12,000 telephones in Sullivan and the counties adjoining will be connected.

The Sullivan Telephone Company's switchboard will be used as a general switchboard by all the companies and lines from all of them will be run to it. The only consideration asked by the Sullivan company is that it shall operate exclusively in Hamilton township, in which Sullivan is located.

The Graysville system guarantees free service with all telephones in Crawford County, Ill.; the Prairie Creek system will give free service with Vigo County, Ind., Independent lines; the Farmersburg system with Clay County lines, and the Pleasantville Company with Independent telephones in Green, Daviess and Knox counties. On Indianapolis connections the Sullivan Company will collect toll. More interest has been evinced in the outcome of this conference by the farmers and others interested in the various lines than is taken in national elections.

INCREASES ITS BUSINESS ENORMOUSLY.

The Newark Telephone Company, of Newark, Ohio, has issued a new directory which shows that the company is now operating more than 1,200 telephones. Its last directory showed only 600 subscribers. A new common battery switchboard has just been installed, which accounts somewhat for the increased number of subscribers, as the service furnished now is as near perfect as possible. The company has connections with Granville, Johnstown, Pataskala and several other towns in Licking County, where it owns branch exchanges. It also has connections with several thousand telephones in the central States over the lines of the United States Telephone Company, of Cleveland. The company is composed entirely of local capitalists.

NEW ASSOCIATION FORMED IN NEW YORK.

Several local Independent telephone companies operating in the southeastern part of New York State held a meeting at Delhi recently at which they formed an association to be known as the Otsego-Delaware Independent Telephone Association. Officers were elected as follows: S. F. Adee, of Delhi, president, and W. W. Capron, of Oneonta, secretary. The companies represented at the meeting were the Delhi Telephone Company of Delhi; the Davis Telephone Company; Union Telephone Company, of Sidney; Ouleout Telephone Company, of Franklin; Walton Telephone Company, of Walton; Andes and Delhi Telephone Company and the Rose Telephone Company. The meeting was held at the home of S. F. Adee, of the Delhi Telephone Company.

The main object of the meeting and of the formation of the association was to secure better toll facilities. This important question was thoroughly discussed and the general sentiment was that the companies should co-operate on a business basis, each constructing new lines where they will do the most good, and the various companies entering into traffic agreements with each other in order that their patrons may have the benefit of the entire system. It is probable that as a result of the meeting many new toll lines will be constructed this summer. Proper connections will be made between Delhi, Oneonta, Walton, Franklin and Sidney. The association will hereafter hold regular meetings and a thorough toll system between the various towns operated by the companies will be brought into existence.

THE PIONEER TELEPHONE COMPANY.

The Pioneer Telephone Company, of Guthrie, Oklahoma, has recently filed a charter with the secretary of state to operate in Kansas. The capital stock of the company is $500,000.

The company contemplates building long distance and local telephone exchanges, telegraph lines, to operate wholesale supply houses and to manufacture electrical goods in Kansas, Oklahoma and the Indian Territory. The charter is very comprehensive and will allow the company to engage in almost every branch of business allied to the telephone and telegraph business.

The stockholders of the company are: John M. Noble, of Oklahoma City; John N. Coulter, of Pawnee; J. C. Sheppard, of Pawnee; Bird McGuire, of Pawnee; E. D. Ninis, of Rooff, I. T., and E. E. Westervelt and D. McKinstry, of Perry, Oklahoma.

CHANGING FROM AUTOMATIC TO MANUAL SYSTEMS.

By J. A. Carr, *Special Correspondent.*

Many of the small Independent telephone companies in the Western part of Kansas and surrounding states, which installed automatic switchboards several years ago, are now changing their plants to the manual system. While the exchanges were in their infancy, the automatic system was found to work satisfactorily, but as these exchanges grew, and the number of subscribers became larger, the automatic did not work so successfully, and a change in the method of operating, if not a necessity, has proven a great improvement. On account of the complex mechanism, and the tendency for this to be continually out of order, the automatic telephone in the territory mentioned has become unpopular, both with the manager and the subscriber. Another cause for the change has been the rapid building of toll lines throughout the country. The automatic telephone does not work well in connection with long grounded toll lines, and in toll line business a manual operator is necessary to keep accurate check on the business transacted.

In changing from the automatic to the manual system, it is not necessary to make a change in the kind of instrument that has been in use. The automatic devices are cut out and connections made in the ordinary manner. Where the system has been changed to the manual, the "triple talking set" is placed on an automatic telephone, which render all instruments capable of being used for long distance talking.

Among the western Kansas companies to make this change in their systems and that are now installing common battery manual apparatus are the following: The Stockton Telephone Company, L. M. Loomis, manager; The Home Telephone Company, Ness City, and LaCrosse, Chas. L. Rogers, manager; The

Lindsborg Telephone Exchange, Grimes Brothers' 'Phone Company, Great Bend, W. B. Grimes, manager, and The Larned Telephone Company, Larned and Dodge City, Alex A. Sharp, president and manager.

The opinion of the local managers may be summed up as follows: That in very small exchanges the automatic telephone, in the form generally used in this part of the country, has been found successful, but when the number of patrons are largely augmented, and the amount of machinery accordingly increased, the trouble begins and it is almost impossible to render good service.

In almost every instance when the manual system has been put in operation, it has been followed by a decided growth in the number of subscribers.

MUSKEGON, MICH., COMPANY HAS 1,000 TELEPHONES.

THE Fourteenth Edition of the exchange directory of the Citizens' Telephone Company of Muskegon, Mich., has just come from the press. The appearance of this edition marks the passing of the one thousand mark on the list of telephones in actual service in the Muskegon exchange.

When the Citizens' Company was organized seven years ago five hundred subscribers was regarded as the maximum number likely to be reached in a good many years. The promoters of the company said they would be satisfied with that number of telephones. But in a surprisingly short time the five hundred mark was reached and the exchange was headed for the thousand mark, which then seemed many years distant. But the growth has been so fast and steady that now that mark has been passed in less than half the time expected.

Along with this growth there has been a constant effort to improve the service. The company is continually replacing old plant with up-to-date apparatus and extending the system. It has just received a shipment of 24,000 feet of underground and aerial cable containing a total of over 600 miles of wire, to be used in making all circuits full metallic.

The switchboard has a capacity of 1,800 lines, and is now equipped for 1,100. As nearly this equipment is now full, a new section will soon have to be added. And at the rate of growth during the past three years it will be only a comparatively short time until a new switchboard will be needed.

TAKING AN OATH BY TELEPHONE.

EDWARD FEUTZ, county clerk at Edwardsville, Ill., took an affidavit over the long distance telephone the other day which authorized the handling of millions of dollars. The story, as told in the newspapers of Edwardsville, was as follows: The heirs of the late John Hayner appealed to the county clerk for speedy action upon the business affairs of the estate. They represented that large sums of money were coming in and that no one was legally authorized to handle this money. The will was filed in court the last of March, but had not been probated and the executors named had not qualified. That they should do so at once was desirable. The executrices are the widow, Mrs. Hayner, and the daughter, Mrs. Florence E. Haskell. Mrs. Haskell had been in New York City for some time, but was just on her way home. The relatives wired to her and arranged an appointment with the county clerk over the long distance telephone. At the appointed hour she called up. The clerk directed her to raise her right hand and repeat the oath of executrix after him, which she did. Mrs. Haskell was thereupon qualified as executrix. She signed the necessary papers immediately upon her arrival in Edwardsville.

CLEARING HOUSES FOR JOINT TOLL BUSINESS.

THAT Independent telephone companies recognize the value of a clearing house for toll and long distance work is shown by the numerous clearing houses which have been organized in the various States. In Wisconsin, the system devised by A. L. Hutchinson, of Weyauwega, has been in operation since August 1, 1902, the State Telephone Clearing Company having been incorporated in Wisconsin in April of that year. The system works perfectly, being simple, reliable and so flexible as to be adapted to all conditions existing between companies doing a joint toll business.

At the December Convention of the Inter-State Telephone Association, held in Chicago, Mr. Hutchinson read a paper on the clearing house which was printed afterward in THE AMERICAN TELEPHONE JOURNAL. Since then State Telephone Clearing Companies have been organized in Illinois and Texas, and have contracted with Mr. Hutchinson for the use of his system. Negotiations are under way at present for establishing the same system in Indiana, Iowa, Nebraska, Minnesota and South Dakota.

NEW EQUIPMENT FOR DURHAM, N. C.

THE Interstate Telephone and Telegraph Company, of Durham, N. C., has closed a contract with the Kellogg Switchboard and Supply Company by which the latter company will furnish and install new equipment for the telephone company. The equipment will be as follows: A local switchboard of two sections, equipped for 600 lines; a toll board of one section, equipped for ten lines; a main distributing frame, an intermediate distributing frame, a relay rack, a power plant, 550 wall type subscribers' telephones and 50 desk sets. The switchboard is to be installed ready for operation by June 1, 1903.

The Interstate Company's business has grown so rapidly since it has been in operation that this new switchboard has been an urgent need for some time. Its present switchboard has long been inadequate and the change was decided on at a meeting of the board of directors some time ago. In addition to the switchboard, central station apparatus and new substations, the company intends to rebuild many of its pole lines, and add several lines both in the city and the surrounding country.

FEDERAL TELEPHONE COMPANY BUYS BACK PROPERTY.

ON good authority comes the information that the Federal Telephone Company, of Cleveland, Ohio, will repurchase the 2,000 shares of Columbus Citizens' Telephone Company stock which it sold to Columbus parties about a year ago. The stock was sold at $45 a share, but the Federal Company retained an option to purchase the stock back at the same figure, plus interest, less dividends, at any time previous to July 1, 1903. It is now practically assured that the Federal Company will exercise this option and repurchase the stock, which is worth a good deal more than $45 a share.

This news is important in that it shows that the affairs of the Federal Telephone Company and its subsidiary companies are gradually being straightened out. Under the management of President Dickson and the new officers of the Federal Telephone Company, the various companies are being reorganized and placed on a thorough business basis. It had been apparent for some time that these companies had been run on a very extravagant scale in some respects, and niggardly in others. President Dickson and his associates have cut down all needless expenses and the results in the short time they have been in control have been wonderful. The companies are all picking up on their earnings and it will only be a question of a short time before they will all be earning dividends and be among the best paying Independent propositions in the field.

NEW COMPANY VERY SUCCESSFUL.

THE Annandale Telephone Exchange Company, operating in Annandale, Minn., has been giving service just eight months. In this time it shows earnings of fifteen per cent. on the capital invested. A stockholders' meeting was held recently and the reports of the officers were very satisfactory. The stockholders and officers feel much elated over the splendid showing of the company and are prepared to go ahead and enlarge the system so as to make its field of operation more comprehensive.

The stockholders re-elected the old board of directors, which in turn re-elected the old officers. Two rural lines running to a considerable distance into the surrounding farming country are now owned by the company. Arrangements are being made for the construction of two more of these lines, as the farmers all around are anxious to have connections with Annandale. The company now has nearly 100 telephones in operation and gives a most excellent service.

The two new lines to be built will run to Southside and Albion. A dividend of fifteen per cent. was declared, as new stock will be issued to pay for the new construction. The company is composed entirely of local parties and it is the desire of the management to keep the stock in Annandale. The company was organized simply for the purpose of furnishing a local service, the promoters not engaging in the business for profits, and the splendid showing, therefore, is especially encouraging. The charge for service is $2 a month.

The Editor's Page.

THE BELL COMPANY'S NEW PUBLICITY SYSTEM.

THERE is a company of gentlemen, with temporary residence at Joliet, Ill., who would be filled with admiration and envy could they read certain public prints these days. These gentlemen fell afoul recently of the U. S. authorities in the matter of a little transaction in green goods. The bases of their operations were little circulars purporting to be newspaper clippings and popularly known as "Green Goods Circulars." It was largely on the evidence of these circulars that the unfortunate gentlemen were sentenced to an active but retired existence within the walls of Joliet.

Had they only waited awhile, they might have had lessons in a green goods circular game that promises just as good results in the way of "catching the farmer" and yet leaves the promoters free and unhampered to pursue their useful careers outside of a cell. This new style of green goods circular emanates from a certain address in Milk street, Boston, and the promoters are a group of eminently respectable and very wealthy gentlemen who control the destinies of the various Bell telephone companies throughout the country. These gentlemen have so far improved on the green goods circular game that they do not send out imitation newspaper clippings, but distribute, instead, the real thing. The beauty of this scheme is that it leaves the workers free from entanglement with the criminal laws. Nor is it much more expensive than the method pursued by the foolish Joliet group.

About the cheapest thing on earth, when he is inclined to be dishonest, is the country editor. For a song he will print anything in his columns, regardless of the mischief he may do to people who still harbor the old-fashioned delusion that any statement seen in type must be true. Taking advantage of this happy state of affairs the Boston financiers, most of whom are devout church members, leading blameless lives, put out *their* "circulars" through the medium of country papers edited by the class of men spoken of. Once the circular is started it is passed along from paper to paper as an extract from an "esteemed contemporary," thus giving the editorial highbinder a shield behind which he can crawl if any of his subscribers, too shrewd to be fooled, get after him with a sharp stick.

"Why, we're not responsible for that statement," the editor protests in these cases; "don't you see it's simply a clipping reprinted from the *Jersey Mosquito?*"

In this way matter carefully put together so that it may damage the cause of Independent telephony, is industriously circulated in any territory where the Bell companies are threatened with active opposition. The object is always to frighten off local investors.

A sample specimen of this new style Boston green goods circular was brought to the attention of THE AMERICAN TELEPHONE JOURNAL last week. It appeared April 25 in the columns of the Huntingburg (Ind.) *Independent,* a small 4-page weekly with a circulation rated at a thousand or less by Rowell's American Newspaper directory. It was, as usual, in the shape of a reprinted clipping, being credited to the *Daily* (Kentucky) *Era.* It is sufficiently instructive to warrant its entire reproduction, headlines and all. It will repay careful reading, not alone by people seeking instruction in methods of advanced criminal art, but as well by men who are interested in the development of Independent telephony, for they may have to meet this sort of green goods work at any time.

AN ADAPTATION OF AN OLD AND FAMILIAR GAME.

The motive for "working" this circular at this particular time through Indiana and Kentucky is clear enough. The Louisville Home Company at Louisville has made a great and instant success, having already more telephones in operation than its 20-year-old Bell rival. The New Telephone Company, of Indianapolis, has given such a good account of itself that its stock is held at 90, with none offered. The New Long Distance Company is just completing a $5,000,000 deal to build lines to St. Louis, Louisville, and a dozen other points, and its bonds are being rapidly taken up. The Delaware & Madison Counties (Indiana) Telephone Company stock, recently listed on the Indianapolis Stock Exchange, has jumped from $20 a share to $45 a share bid, and none offered at that figure. Practically all the Indiana and Kentucky companies are enjoying a similar boom, owing to their rapid growth and substantial, demonstrated earning powers. New Independent lines are springing up in every direction, until the two States promise to be covered with a complete net work from boundary to boundary. New companies are being organized every day to carry on and extend the work. And all this is being accomplished by local men and local capital, while the Bell, controlled by Boston carpet baggers, is falling backward steadily in this territory. Its sceurities are depreciating, its list of subscribers is falling off and it is being driven out of some towns entirely.

In the face of such a situation exceptional measures are of course necessary if the Bell is to hold any sort of position. But it is unfortunate that in adopting such measures the Boston gentlemen could not see their way clear to going at the work in a legitimate manner, instead of resorting to methods that are popularly supposed to be employed only by men whose faces are, or ought to be, in the Rogues' Gallery.

That this latest "circular" printed in the Indiana paper bears this rogues' gallery stamp may be seen from its perusal. It runs as follows:

> GREAT DEAL OF MONEY.
>
> **Lost in the Organization of Telephone Companies.**
>
> The press dispatches in referring to the closing of the three banks in English, Marengo and Leavenworth, state that "the triple failure is even worse than was at first supposed. It is now estimated that the syndicate that controlled the banks has sunk not less than $500,000 in various deals. A large amount of money was lost in the organizing of telephone companies which were to furnish service to small towns in Southern Indiana. Nine township trustees lose all the public money in their possession. Under the State law the stockholders are liable for the full amount of their private estate, and the depositors are assured that they will receive something. Three-fourths of the families in this county have been affected by this failure, and hundreds of honest men cannot pay their debts. The failure of the Haughgey Bank at Indianapolis or the crash of other banks several years ago are not to be mentioned in the same list with this failure here. Conservative men say this is more than a failure—it is a calamity."
>
> The indications are that the stockholders in every bank in Indiana and Ohio suspected of dabbling in the telephone craze will demand a rigid investigation regarding the value of the securities given.
>
> Referring to the foregoing, it is just as well to speak plainly. Too much indiscriminate, loose handling of depositors' money, has been indulged in by many of the bankers in recent years. Speculating with the hard-earned money of depositors has caused many suicides and untold distress.
>
> There seems to be a craze going over the country to establish telephone exchanges, in opposition to the old, established, powerful and well intrenched companies that have ample capital and experience. And as the business is essentially a monopoly, there can be but one way of escape for these new concerns, and that is to sell out to these old companies, who are smart enough not to let any of them out, if at all, only with heavy loss.
>
> Under such circumstances it becomes an act of recklessness for any banker to be dabbling with such ventures, and the law should be meted out in full to the people who have so shamefully thrown away the money of the public on these telephone ventures in Southern Indiana.—*Daily* (Kentucky) *Era.*

To hang an attack on Independent telephone securities on a bank failure is rather clever, but, under the circumstances, thoroughly dishonest. The Boston people and their agents, better than anyone else, know that the failure of the three Indiana banks had no more to do with Independent telephone properties than it had with the improvements on the River Nile. The syndicate of schemers who managed these banks had absolutely nothing to do with the telephone development work in their section and had no "deals" in Independent stocks.

Fortunately all these Bell attacks through venal newspapers, no matter how well disguised they may be in other directions, have certain well-defined finger marks that make their authorship clear even to the most foggy intellect. In this particular effusion the whole thing is given away by the fourth paragraph. What a fine familiar ring there is to these words:

". . . . a *craze* going over the country to establish telephone exchanges in opposition to the *old established powerful* and *well intrenched* companies that have plenty of capital and experience." And, again: "As the business is essentially a monopoly there can be but one escape for these new comers," the "one escape" being, of course, a sale to the Bell. As there are 6,000 Independent companies in active operation, the Bell will have to keep its salvage apparatus well oiled up.

SOME METHODS OF CONNECTING EXTENSION INSTRUMENTS

By A. Dallam O'Brien.

THERE are many cases where it is desirable to have access to the telephone at more than one point, but the demand for service is insufficient to warrant a number of telephones and branch exchange switchboard. It is in cases of this kind that the extension instrument finds its sphere. It is purposed to show some of the ways in which extension instruments are used, and the methods of connecting them. The simplest case is that of one line to the central which the subscriber desires to use at two or more points. It is well to state that this article deals only with common battery systems. Fig. 1 shows the method of connecting the instruments for these requirements. The lines coming from the central office are attached to the main instrument in the usual manner, the extension being connected either by a pair of wires running from binding posts 1 and 3 on the main instrument or else the line wires are tapped and the tap run to the extension. The effort is to connect both instruments in multiple. It is seen that both bells will ring on a call from central, and that either instrument may signal the operator. There is nothing to prevent a person at the extension from overhearing a conversation carried on from the main instrument and communication can only be maintained between the main and the extension by battery from central. In order that one instrument may call the other, the operator must first be obtained and asked to ring over the line, thus signalling all its stations. The instruments are shown as being on a direct line, but if it is desired to place them on a party line the only change is to remove the connection between binding posts 1 and 2 and run a wire from No. 2 to ground.

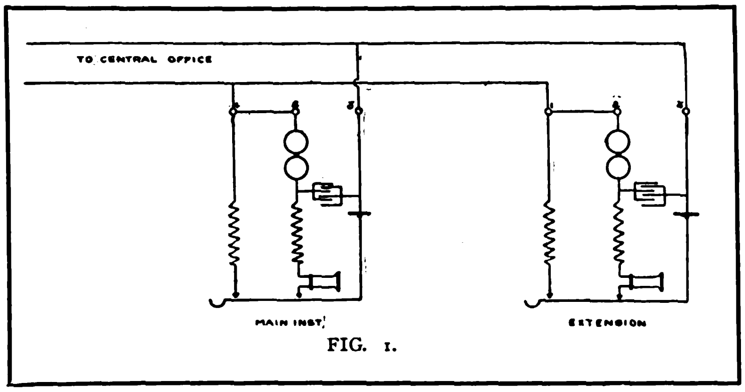


FIG. 1.

The number of extensions that can be connected to a single line is limited only by the ringing current. If each instrument must be answered whenever the line is rung, confusion and loss of time will increase with the number of instruments, and in practice two extension instruments are considered sufficient. Fig. 2 shows a circuit for connecting any number of extensions on one line and enabling each call to be so handled that only the main instrument and the required extension receive the call. The central office lines are connected direct to the main instrument from the binding posts 1 and 3 of this. Wires are run to the inner or normal contacts of a ringing key as shown in the figure. From the long springs wires are run to the long springs of the switching keys as shown, so that all the switching are bridged across this pair of wires. The outer contacts on the ringing key are connected to a magneto generator shown, and the outer contacts of each switching key are connected to wires which lead to the corresponding extensions. Every call is received on the main instrument and the required extension is then called by the operator at this instrument by throwing the cam of the switching key, pressing the ringing key button and operating the magneto. The extension instruments are unable to call the central office unless special provison is made by having the cam of the switching key thrown. This may seem a disadvantage, but this method of connecting extensions is devised for business houses where the unlimited use of the telephone is undesirable. The ringing and switching keys are mounted together in a small box near the main instrument and thus easily reached. The extensions are wound in the same manner as shown in the main instrument, the binding posts only of the extensions being shown in the figure.

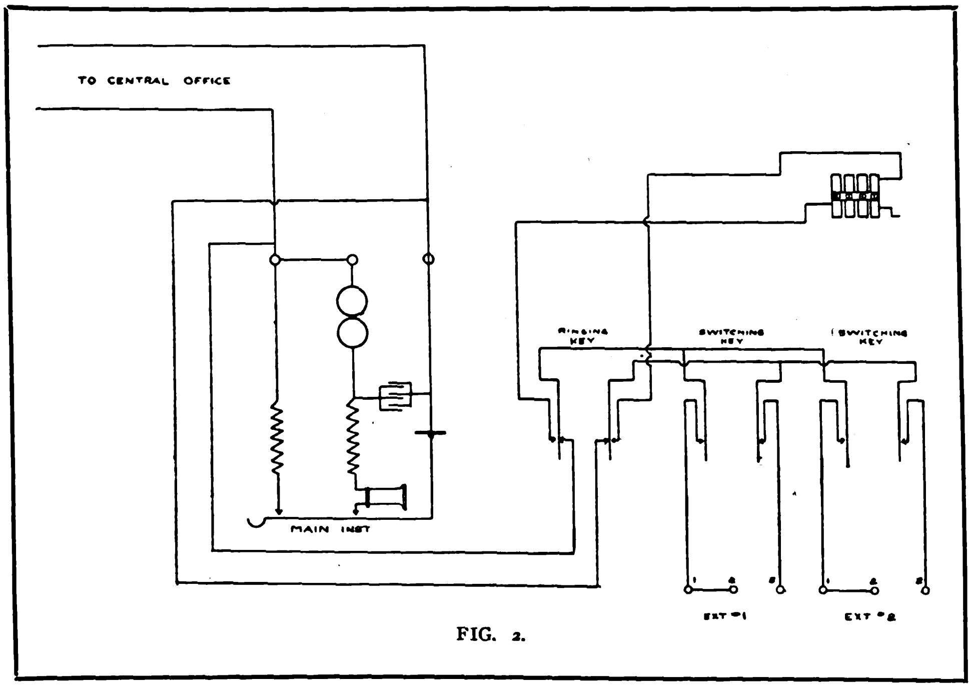


FIG. 2.

Fig. 3 shows a method of connecting an extension to a main instrument using the induction coil in the main instrument to answer for the extension. The extension instrument is able to call the central office, but cannot receive calls. The induction coil terminals are topped as shown, and wires led to the extension. Incoming calls may be received by a clerk, the calling party identified and the official on whose desk the extension is located is not forced to answer the telephone when the business is of such a nature that it can be handled by a subordinate. Conversations on one instrument can, however, be heard on the other.

Fig. 4 shows an extension and main instrument connected in such a way that when the main instrument is in use the extension is cut out, the circuit being opened at the hook switch. Calls are received over both instruments, both are able to call the central except that the extension is cut out when the main instrument is in use. For ordinary purposes, when absolute privacy of conversation is not required, this method of connection will answer very nicely, but in cases where it is desired to entirely avoid the possibilty of the conversation being overheard at the extension, it is better to install a switching key and open both sides of the extension circuit. In the circuit shown, one side of the extension is connected to the line, and a test on an extension of this kind showed that when the main instrument was in use a person at the extension was able to overhear to some extent. This is due to the change in resistance of the transmitter which changes the current, hence the drop in pressure varies and the potential at each point in the circuit changes the static charge on the wire connected to the extension changes, and there is a flow of current from the main to the extension and back to the line which enables portions of the conversation to be overheard. In some instances it is unnecessary to provide an extension instrument, but merely to enable the subscriber to be notified of a call when he is at some distance from the telephone, and in order to do this extension bells are provided. The bells are mounted in boxes which contain the coils and maget, and the terminals of the coils are brought out to two binding posts on the base of the box. These bells may be connected into the circuit by binding them across the line or they may be connected in series with the bell on the main instrument. When the extension bells are bridged, a pair of wires is run from binding posts 1 and 3 on the main instrument and connected to the terminals of the bell coils. It is necessary to provide a condenser for each bell, the condenser being placed in series in one side of the bell circuit. This is done in order to keep the line circuit from being closed through the ringer coils. When the bells are placed in series, there is no connection at the instrument between binding posts 1 and 2, but a wire is led from post No. 2 to the extension, and if there be more than one bell, it is led in series through all the bells, the free posts on the last bell being connected to the line wire that runs to post No. 1 on the main instrument.

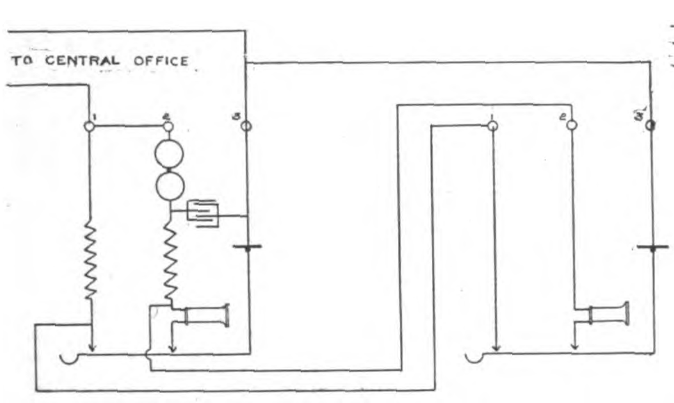


FIG. 3.

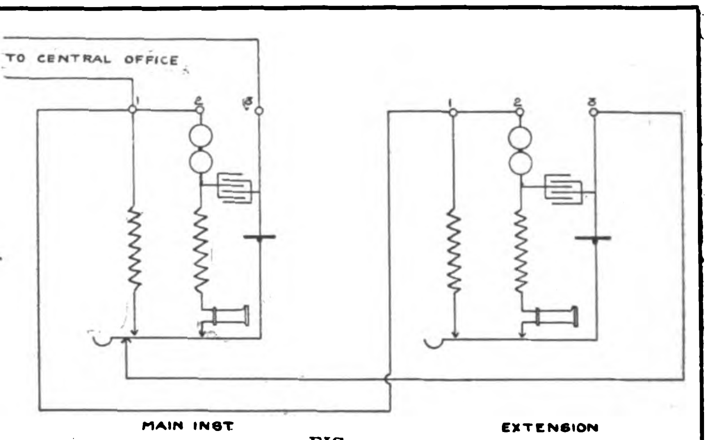


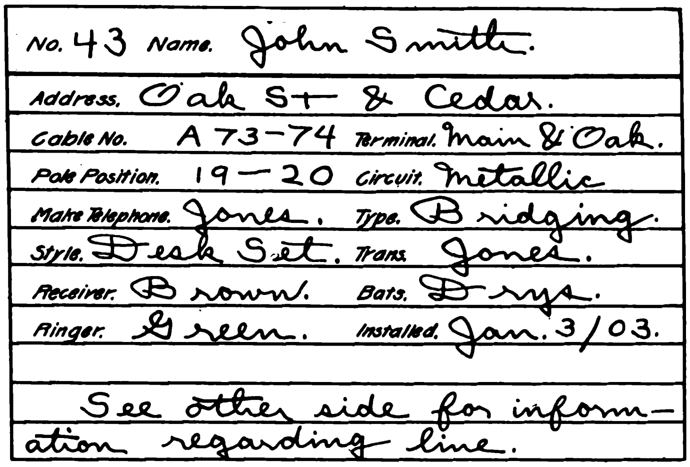
FIG. 4.

A CARD RECORD SYSTEM AS AN AID TO A SMALL EXCHANGE TROUBLE MAN

By Terrell W. Croft.

In large telephone exchanges some method must be adopted to enable the wire chief to quickly ascertain what route any pair of conductors may take, so that the trouble man may be directed where to go to look for trouble. Card records are used universally, and with such satisfaction that probably no other system will replace them.

A card record consists of a set of cards of a convenient size, one for every telephone in the exchange. On each card is found all the data needed for the subscriber in question. Fig. 1 shows such a card, which is the form used by a prominent company. On it is an example of all the information desired by the wire chief. The terms are self-explanatory. First comes the subscriber's number and class of service; also whether the telephone is at a residence or a place of business. Following "U. G. Cable," the number of the underground cable through which the circuit leaves the exchange is placed; after "Condrs." the numbers of the conductors which the circuit takes through the cable; in the space following "Terminal" the street location of the terminal box in which the cable ends. In a large city a circuit may go through both underground and overhead cable before it takes a pole line and blank spaces are provided for such information. In Eastern cities cables are sometimes run on fences in the rear of houses, and there is room on the card for the reception of such data. Next comes the space for the street location of the pole, from which the aerial line runs after leaving the cable, the numbers of the pins taken by the circuit being written after "Pins."



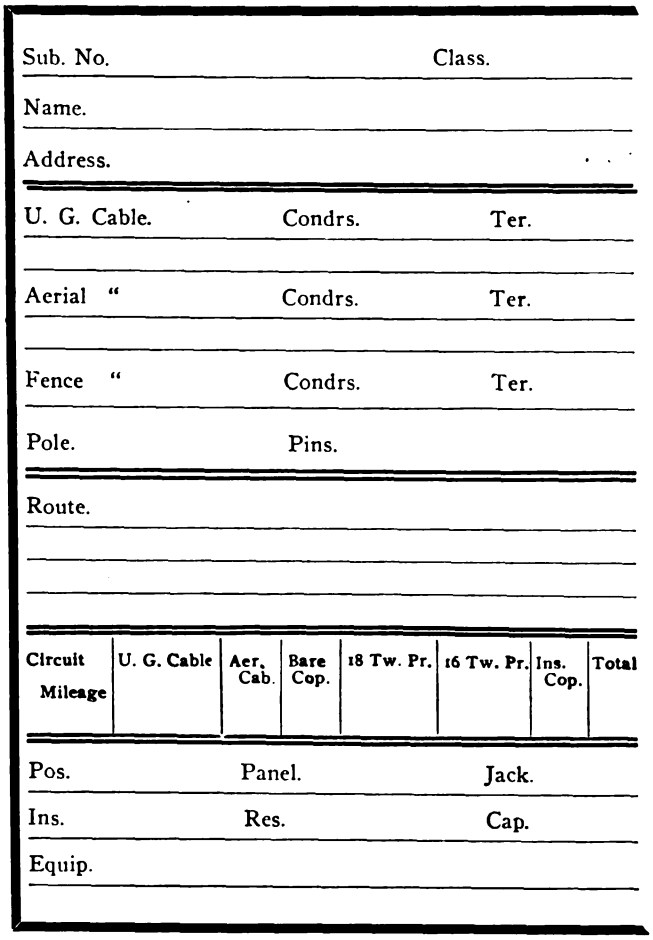
No. 43 Name. John Smith.
Address. Oak St & Cedar.
Cable No. A 73-74 Terminal. Main & Oak.
Pole Position. 19-20 Circuit. Metallic
Make Telephone. Jones. Type. Bridging.
Style. Desk Set. Trans. Jones.
Receiver. Brown. Bats. Drys.
Ringer. Green. Installed. Jan. 3/03.

See other side for information regarding line.

FIG. 2.—CARD FOR SMALL EXCHANGES.

Between the next two dark lines the route which the circuit takes from the central office to the subscriber's telephone is specified. Under "Circuit Mileage" comes the lengths of the different kinds of conductors which comprise the circuit. They are arranged in their order from the central office, viz.: underground cable, aerial cable, bare copper, No. 18 twisted pair, No. 16 twisted pair, insulated copper, and in the last space, total miles. The No. 16 twisted pair is used for dropping from the pole to the house, or to carry the line across the house tops, or through trees if a pole line does not reach the subscriber's station. The No. 18 is used in inside wiring. After "Position" and "Panel" is to be given the number of the operator's position and of the panel, on the switchboard on which the answering jack is placed. In the space after "Jack" the number of the answering jack is to be written. Next comes the insulation resistance, the resistance and the capacity of the line. Following "Equipment" letters are placed which show what type of telephone is at the subscriber's station; whether it is a wall set, metal desk stand, cabinet desk set, or any other of the equipments that are used. In the blank space below this may be written any other information. On the back of the card is a form in which previous cases of trouble on this line are recorded, spaces being arranged for date, kind of trouble reported, test, time man was sent out, nature of trouble found, and the time the line was again put into service. Each time there is trouble on that line, entries as above are made in the appropriate spaces. The cards are ruled so as to accommodate twenty-six cases of trouble.

These record cards are arranged in order of numbers in a box, and placed in the wire chief's desk, where they are accessible without moving from the position occupied in testing. If a case of trouble is reported, the number of the telephone being given, all that is necessary for the wire chief to do is to pick out the proper card, and he has before him not only all the information regarding the circuit, but the record of all previous trouble, which may give him a clue to the cause or location of the case in hand.



Sub. No. Class.

Name.

Address.

U. G. Cable. Condrs. Ter.

Aerial " Condrs. Ter.

Fence " Condrs. Ter.

Pole. Pins.

Route.

Circuit Mileage	U. G. Cable	Aer. Cab.	Bare Cop.	18 Tw. Pr.	16 Tw. Pr.	Ins. Cop.	Total

Pos. Panel. Jack.

Ins. Res. Cap.

Equip.

FIG. 1.—CARD FOR LARGER EXCHANGES.

This form is condensed as to width. The width should be 6 inches.

A book might be made to answer the purpose, but as old subscribers discontinued service, or had their numbers changed, the book would soon be filled with dead matter and become useless. Again, only one person can refer to a book at a time, while several can use the same card record.

It is purposed to show how the same idea can be carried out in smaller exchanges, even down to those with only seventy-five or one hundred drops.

Fig. 2 shows a suggestion for such a record. It is not intended to cover all cases, as every one will have its peculiarities. There should be a place for the drop number, name of subscriber and his address. The cable letter and number, and where it terminated, come next. Following, might be given the pole position of the wires, "19—20" meaning that the wires occupied the ninth and tenth pins (counting from the left, facing away from the exchange) on the second arm from the top, assuming, of course, that a ten-pin arm is used. There should also be written information as to whether the circuit was grounded, common return, or metallic.

The data which follows should be of special value to the small exchange trouble man. In a large exchange, where the installation is uniform, inspectors know exactly what will be found at the subscriber's station, and can take the part which is wanted, having the assurance that it will fit. In the small, independent exchange, however, when the trouble man starts out, he may find at the station one of a half-dozen different makes of equipment, or the telephone may be one made over at the exchange and composed of parts of two or three others—the transmitter, receiver and ringer all being of different makes—and unless he knows this before starting he stands an excellent chance of having to return for some special part. This same thing is true of batteries.

The date the telephone was installed would be of value; so this should be stated on the card. If there is any special peculiarity as to the way the line was run, or in the make-up of the telephone, this could be written on the back of the card, where there is more room, but there should be a note on the front to call the reader's attention.

Nearly every small exchange trouble man is so familiar with his system that he knows the kind of equipment at a large share of the subscribers' stations, and would consider a card record system of this kind unnecessary, but he will not be there always, and in case of sickness, this kind of a record would be of the greatest value to a new man. As to keeping up the system, the night operator could write up the cards from rough notes received from the installers.

The cards should be kept in a box fastened to the end of the switchboard, where the operator would be able to reach them easily. When a case of trouble was reported she could make a note of it, and by referring to card record, write on the slip such information as would be necessary for the trouble man. During the busy part of the day the operator might not be able to do this, but usually small exchange operators have considerable unused time.

Any kind of a card could be used, but all must be of uniform size, or more time will be wasted in trying to pick out a small card than the system is worth. Record cards made of specially prepared linen stock, and of exactly uniform size, can be obtained so cheaply that it will not pay to bother with others. The card shown in Fig. 1 measures 4x6 inches, which appears to be a very satisfactory size. Cards of this size, horizontally ruled, and of heavy weight stock, can be bought for forty cents a hundred in hundred lots. For the comparatively few cards that would be required for a small exchange it would not pay to have a form printed. To secure regularity in the arrangement of the data one sample card could be lettered something like Fig. 2 and used for reference. In writing other cards, it would not be necessary to letter the form; if the information was written in its proper place there would be no trouble in distinguishing to what it applied.

The box to hold the records should be made at the exchange; there are no stock boxes so small. The cards for a two-hundred subscriber exchange would not require a box longer than 2½ inches, and ordinarily the shortest length of box that is catalogued is 8 inches. The box should not be quite as deep as the cards are high. This is necessary so that a card can not tip down in the box, where it would be impossible to get at it. For cards 4 inches high, 3½ inches would be a good depth. The width of the box should be such as to keep cards in line, for the corners are used, both in turning the cards and in taking them from the box.

DOCTORS CHARGE FOR TELEPHONE CALLS.

It has occurred to many persons that the telephone could be used to save doctors' bills, and they have frequently used it for this purpose. It was very convenient to call up the doctor at any time of the day or night, and ask his advice, after describing the patient's symptoms—and besides there was no charge attached. But the doctors have rebelled. They didn't think it was convenient to be made a convenience of, and hereafter all telephone prescriptions will be charged for, at least in Allegheny County, Pa., where is located the seat of the rebellion.

This action was taken at the annual meeting of the Allegheny County Medical Society held in Pittsburg recently. The charges made for doctoring by telephone will be from $2 to $5 per call. Other medical societies are expected to follow the lead of the Allegheny County society, and in the near future doctors' dead head telephone prescriptions will be obsolete.

The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

EXCLUSIVE CONTRACTS AND U. S. PATENT LAWS.

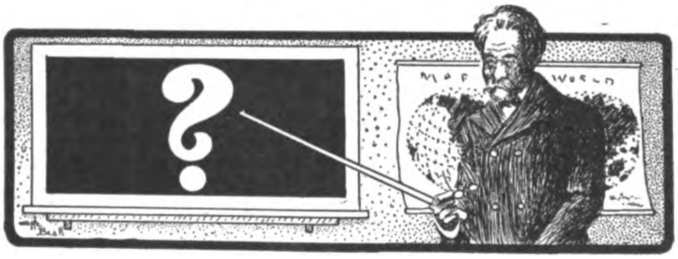
THE following inquiry is submitted by a reader subscribing himself "Patent Solicitor":

> I understand that the so-called Bell telephone companies operate their lines under licenses from the holders of the telephone patents, and that the terms of the licenses usually require that service shall not be furnished to certain companies or individuals without the consent of the patentee. If this is so, are not decisions, such as the one in the case of C. M. Mitchell and R. E. Everett vs. The Home Telephone Company, of Springfield, Mo., referred to in your issue of April 18, contrary to the provisions of the statutes of the United States giving owners of patents exclusive rights in the inventions covered? The exclusiveness is the valuable part of the grant. A patentee may dispose of just so much of his grant as he desires, and upon such terms as he sees fit. Nor can any power make him dispose of a larger grant than he is willing to make. Do not these recognized principles of patent law confer upon the holders of the Bell patents the right to impose upon their grantees the restriction that they shall not serve rival companies nor individuals who use rival telephones?

While the conductor of this department does not desire to pose as a supreme court of telephone law and competent to review the decisions of state and other tribunals, the law is well settled and he will state briefly the grounds upon which the holding void of exclusive telephone contracts is said to harmonize with the United States patent laws granting patentees exclusive rights in their inventions. The principles of patent law that our interrogator mentions are correct when applied to ordinary inventions that are not subjected to what is called a "public use." A telephone patent, however, is worthless unless it is devoted to the use of the public. Its owners, by devoting it to such use and accepting the profits that result from it, are held to have assumed corresponding obligations to the public, of which the chief is the duty to serve the public impartially. The status of telephone companies is that of common carriers, like railroads and telegraph companies. Telephone companies cannot ask from the state the right of eminent domain nor accept authority to occupy public streets and roads, and at the same time avoid their obligations to the public. Their exclusive right in their patent and their right to dispose thereof upon their own terms are waived by the acceptance of such privileges from the public. It is therefore held that the rule of law recognized in such decisions as the one mentioned, where exclusive contracts were held void, is not in conflict with the United States Statutes nor decisions thereunder. See Commercial Union Telephone Company vs. New England Telegraph, etc., Company, 61 Vt. 241; 15 Am. St. Rep. 893; Munn vs. Illinois, 94 U. S. 113.

ANSWERS TO QUESTIONS

Conducted By
WILLIAM W. DEAN



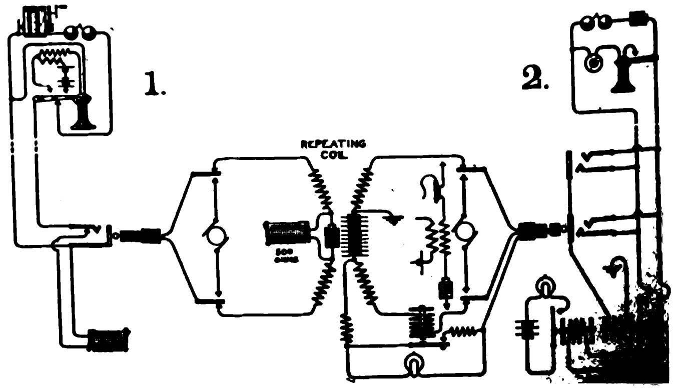
Queries on any subject relating to the technical side of telephony will be answered in this colnmn.

CONNECTING MAGNETO TO COMMON BATTERY.

Kindly publish diagram of circuits for connecting a magneto system to a common battery system. CONSTANT READER.

Referring to the attached diagram, the right-hand end of the figure represents a common battery board (Bell type). The left-hand end of the circuit represents a magneto subscriber's outfit. The right-hand side of the cord circuit is arranged for common battery signaling and the left-hand end for magneto signaling.

In the centre of this cord circuit is a standard common battery repeating coil, to the centre of the right-hand winding of which is inserted the 24-volt battery for furnishing current for the common battery subscriber, No. 2. The left-hand side of the repeating coil has a 500-ohm drop connected between its central points, which drop is bridged by a two m. f. condenser. This condenser offers very high resistance to the low frequency alternating currents such as are produced by the magneto generator at station No. 1, so that when the subscriber wishes to ring off, practically all of the current from his hand generator passes through the clearing-out drop. The two m. f. condenser offers a very low resistance path to the high frequency telephonic currents, consequently, in talking, practically all of the voice currents pass through the condenser, so that the 500-ohm drop introduces no impedance in the talking circuit.



You will observe that any of the well-known common battery circuits, either two or three-wire, can be substituted for the one shown.

Patents

ELECTRIC MEASURING INSTRUMENT.

Louis M. Pignolet, of Orange, N. J., patents (No. 725,765) a volt-ampere meter. This is a patent for an improvement in electrical measuring instruments known as Voltmeters, Ammeters or Voltammeters, and is illustrated in Figs. 1 and 2. The improvements claimed are: First, an arrangement for making the instrument dead beat so that the indicating needle may come to rest promptly and quickly. Second, a device whereby the instrument is protected from the perturbing action of powerful magnetic fields. Third, a means enabling high voltages to be read with greater accuracy.

FIG. 1.

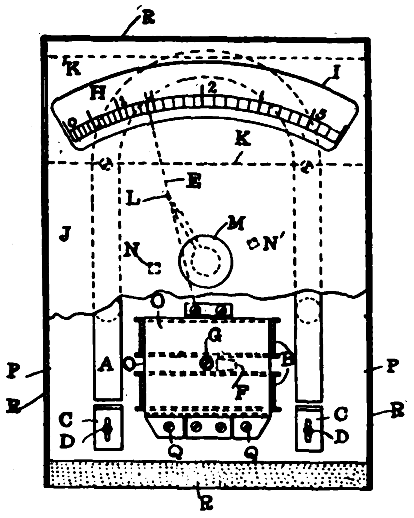
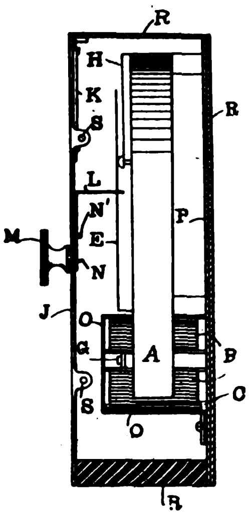


FIG. 2.



The first improvement is secured by means of a mechanical stop that is set by hand approximately at the voltage or amperage that is to be tested, thus limiting the motion of the needle to a very small arc, consequently it rapidly comes to rest. The second improvement consists in so surrounding the coils of the instrument with an iron shield as to protect them from external influences. The third improvement is provided in a particularly shaped needle which forms the moving system in this invention. The illustrations are almost self-evident. The mechanical stop is shown at *L* Fig. 2 as a forked arrester attached to the head *M*. In these illustrations the anti-magnetic screen is shown, consisting of the iron pipe *P* and the shield *O*.

INSULATOR.

Robert P. Polk, patents (No. 724,329) an aerial line insulator. This is a patent for an improvement in aerial insulators particularly adapted to the securing of drop wires from open wire lines to subscribers' sub-stations. It is illustrated in Fig. 3. This diagram is self-explanatory. The insulator made of porcelain or glass is supplied with an umbrella-like roof, containing four slots. The drop wire twisted in the form of a loop may be passed around the insulator under the umbrella and the bight on the loop dropped over one of the projections formed by the slots.

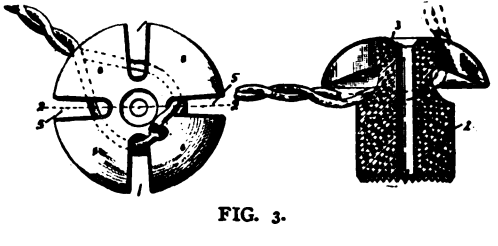


FIG. 3.

TELEPHONE APPARATUS.

Frank W. Wood, Newport News, Va., patents (Nos. 726,835 and 726,836) and assigns to Charles Cory & Son, New York, telephone apparatus. Both of these patents cover the arrangement of telephone apparatus in such a manner as to make it serviceable and useful on board ship, the design of the inventor being to enclose the receiver and transmitter in such a manner as to prevent corrosion by salt air and to render both transmitter and receiver serviceable under trying conditions of naval engagements.

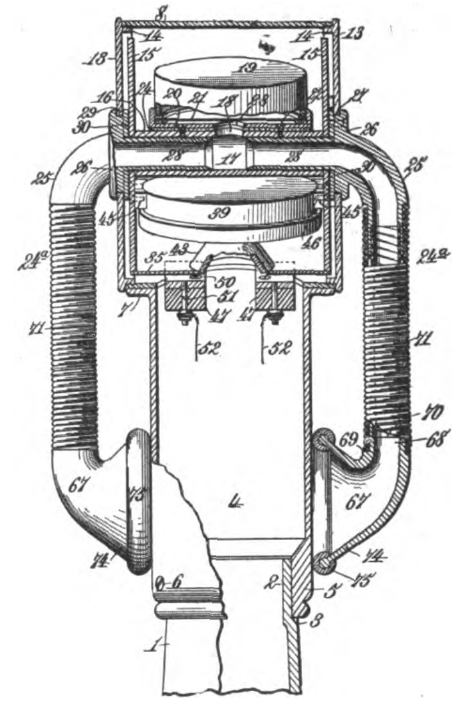


FIG. 4.

The chief features of these patents are shown in Fig. 4, and the invention essentially consists in enclosing the transmitter and receiver in a tight case, 8, provided with ear tubes, 75, and a mouthpiece, 43. When out of service the tubes are turned down and the case is closed and air-tight.

When it is desired to use the telephone apparatus, the ear tubes 75 are turned upwards for application to the ear, which swings the transmitter mouthpiece outwards and opens the case and allows the instrument to be used.

IMPROVEMENT IN PROTECTIVE DEVICES.

Charles A. Rolfe, Chicago, Ill., patents (No. 724,507) and assigns to the Rolfe Electric Company an electrical protector. This is a patent for an improved device for protecting electric circuits of all descriptions, from lightning discharges, sneak currents or abnormal currents. It is shown in Figs. 5 and 6. There is a base block of insulating material, *B*, on which the two subsidiary blocks, 1 and 2, are mounted. Block 1 serves the purpose for protection from lightning. This consists of a grounded plate *D*, carrying a carbon block *E*, which is covered with an insulating paste made of shellac and powdered glass. Around this block the spring 12 is coiled, which is connected to the line. In case of a lightning discharge the space between the coil *E* and the spring *D* forms a spark gap and allows the discharge to go to earth. If an arc is formed its heat melts the shellac and allows the spring to recoil to the vertical position. The abnormal current protector is mounted upon block 2. This consists of a spring 9, which is pulled horizontally and held in place by a fusible button 8, which is in series with the line. Inside of this button is a coil of resistance wire. In case of an abnormal current, the heat developed by this coil will melt the button and allow the spring to recoil to the vertical position, opening the line.

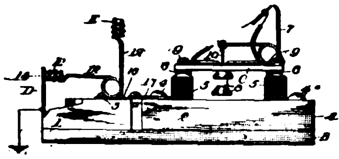


FIG. 5.

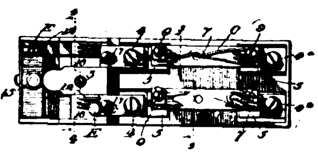


Fig. 6.

The Week's Messages.

FINANCIAL

BLISSFIELD, MICH.—The Blissfield Telephone Company has increased its capital from $7,000 to $25,000.

FARMINGTON, ILL.—The Citizens' Mutual Telephone Company, of Farmington, has increased its capital stock to $5,000.

GRAND RAPIDS, MICH.—President Charles Rood, Secretary E. B. Fisher and Manager C. E. Tarte, of the Citizens' Telephone Company, attended the meeting of the directors of the Calhoun county exchange at Battle Creek recently and declared the usual 4 per cent. semi-annual dividend.

HART, MICH.—The Oceana Telephone Company has declared a quarterly dividend of 1½ per cent. The company is about to put in a new switchboard at Hart.

BUXTON, N. D.—The Buxton Telephone Company has decided to increase the capital stock to $50,000.

HANNIBAL, OHIO.—The Hannibal and Round Bottom Telephone Company has increased its capital stock from $1,000 to $2,000.

COLUMBIA, PA.—The Columbia Telephone Company has increased its capital stock from $50,000 to $75,000.

BLOOMER, WIS.—The Bloomer Telephone Company has increased its capital stock from $8,000 to $15,000.

CASCO, WIS.—The Casco and Brussels Telephone Company has increased its capital from $400 to $1,500.

WALWORTH, WIS.—The Walworth Telephone Exchange Company has increased its capital from $1,200 to $2,200.

FRANCHISES

VENTURA, CAL.—The Ventura trustees have granted a franchise to the Home Telephone Company to build and operate a telephone system for a period of thirty years.

COUNCIL BLUFFS, IOWA.—If the city council concurs in the recommendation of the committee of the whole an ordinance will be passed granting the Western Iowa Independent Telephone, Telegraph and Terminal Company a franchise to establish a local exchange and telephone system in Council Bluffs. This is the company organized by T. D. Metcalf, Dr. D. Macrae, Jr., and associates.

GARDINER, ME.—The Northeastern Telephone Company, of Portland, has been given a franchise to erect poles and wires, build conduits on all of the streets of this town and conduct a telephone business here.

STILLWATER, MINN.—The Consolidated Telegraph and Telephone Company is continuing its effort to secure a foothold in Stillwater, and has presented an ordinance to the city council which has been placed upon its first reading giving the company a right to extend its long-distance lines from the Atwood A to the Atwood B mill.

WILLOW SPRINGS, MO.—D. L. Groce and associates have been granted a franchise to construct and operate a local telephone system.

HIGH BRIDGE, N. J.—The Lebanon Telephone Company and the Farmers' and Merchants' Telephone Company have applied for franchises to enter the borough of High Bridge.

PERTH AMBOY, N. J.—The borough council have received a petition from the Hudson and Middlesex Telephone Company asking for a franchise.

LUDLOW, OHIO.—The Ludlow Telephone Company has petitioned the board of county supervisors to grant a franchise for the purpose of stringing wires and erecting poles on the turnpikes.

PORTLAND, ORE.—The special committee on telephone ordinance has drawn up a document granting a franchise to the Home Telephone and Telegraph Company, which will be submitted to the next meeting of the council without recommendation.

WYTHEVILLE, VA.—The town council has decided to advertise for sale a franchise for a mutual telephone company. A company of this character has recently been formed and is now operating in this county.

RATES

JOHNSTOWN, N. Y.—The Glen Telephone Company has decided to raise its rates not to exceed 25 cents per month, the charge of $2.25 being made for business telephones and $1.25 for residence telephones.

ELECTIONS.

CHICAGO, ILL.—Arthur D. Wheeler has been elected president of the Chicago Telephone Company to succeed John I. Sabin, who will return to his home in California. Mr. Wheeler had been second vice-president and A. S. Hibbard, now the general manager of the company, was elected second vice-president. A. J. Steiss, who came from California with Mr. Sabin, to fill the office of assistant to the president, will remain for awhile with President Wheeler, in the same capacity. L. G. Richardson was elected president of the Central Union Telephone Company, A. D. Wheeler was elected chairman of the board, and Mr. Hedge auditor of the company. It is understood that Horace F. Hill is to be appointed general manager.

EVANSVILLE, IND.—At a meeting of the stockholders of the Municipal Telephone Company the following officers were elected: President, James W. Tauer; treasurer, R. K. Dickerson; secretary, F. M. Petersheim, F. E. Eversole has been employed as construction engineer.

CLIFTON, KAN.—At the annual meeting of the stockholders of the Clifton & Vining Telephone Company the old officers were re-elected: William Murdock, president; A. Wangerien, vice-president; D. C. Tyler, treasurer; P. M. Harmon, secretary, and T. M. Dolan, manager.

CONCORDIA, KAN.—G. G. Hill, F. W. Dougherty and William Lutt, of the Concordia Telephone Company, have returned from Abilene, where they met with the other Independent telephone men interested in the new Union Telephone Company, which will build a toll line connecting this section with Kansas City, Topeka, etc. Officers of the new company were elected as follows: C. P. Dewey, Manhattan, president; A. T. Rodgers, Beloit, vice-president; M. M. Smith, Minneapolis, treasurer; Cleyson Brown, Abilene, secretary.

FREDONIA, KAN.—The stockholders of the Fredonia Co-Operative Telephone Company held an annual meeting recently and re-elected the old board of directors, as follows: Isaac Hudson, A. D. Crooks and J. F. Hollis, for two years; J. T. Cooper and J. A. Burge, for one year. The meeting was favorable to the extension of new lines. It was voted to open the books for three months and permit original stockholders with one share to take a second share for $40, and all others to become members for $50 per share.

ROME, KAN.—The Farmers' Mutual Telephone Company, at their meeting in Rome last week, elected the following officers: W. Lantz, president; Preston Wyckoff, vice-president; Homer Williams, secretary; H. Harbaugh, of Rome, treasurer. The preliminary steps were taken and committees appointed, one of which was to find a location for the proposed line. M. O. Ruthrauff, P. A. Wyckoff and W. Lantz left here for Wellington for that purpose and found a suitable route. Construction will begin at once.

HANNIBAL, MO.—The board of directors of the Miller Township and Hannibal Telephone Company have elected officers as follows: President, George W. Pine; secretary and treasurer, L. A. Frazier; managers, H. Clay Whaley and C. C. Dudley. The lines are all to be reconstructed.

LA GRANGE, MO.—At the annual meeting of the Canton & La Grange Telephone Company, the old directors were re-elected as follows: J. T. Muir, president; Robert Poage, vice-president; E. F. Westhoff, secretary, and George Ousley, treasurer. William Jennings, Robert Poage and George Ousley were elected as the board of managers.

WEST HOPKINTON, N. H.—F. H. Carr, J. G. Rice and O. F. Fuller have been elected directors of the West Hopkinton Telephone Company. Telephone communication has been opened with North Dunbarton and a way station for South Hopkinton has been established at Boutwellville.

THE WEEK'S MESSAGES—Continued.

SOUTH BYRON, N. Y.—The Bell Telephone Company has met defeat in the construction of a line from this village to Byron Center. The company had erected its poles across the farm of Miss Childs, who resides in Toledo, Ohio, expecting to get the right of way later on, but Miss Childs does not see fit to grant it and the Bell company, after all its efforts to beat the Inter-Ocean Telephone Company, has taken up its poles and retires from the contest. The Inter-Ocean has the right of way for the entire route, and its line is nearly completed.

COMBINATIONS.

PRESTON, IOWA.—The Jackson Telephone Company, of Preston, has been merged into a corporation with a capital stock of $25,000. The officers are N. J. Millhaom, president; F. V. Potter, secretary and treasurer.

CENTRE, KAN.—A deal has been completed by which the Exchange Telephone Company of this place is now owned by W. H. Nelson, R. M. Pickler and I. M. Mahin. The new owners promise some important improvements in the service.

OSAWATOMIE, KAN.—The Osawatomie Telephone Company has sold the Linn county toll line to Charles F. McClay, of Parker, Kan.

LARONE, ME.—E. A. Covel has purchased the local telephone system. The present owners will take stock in the new company. Mr. Covel will consolidate with Mr. Holt, of Clinton, who already owns and manages a line at Pishon's Ferry and East Fairfield, and the two lines will be connected and extended as fast as practicable.

MACON, MO.—The syndicate headed by Theodore Gary will without doubt become the owners of the Chillicothe telephone exchange in the near future. A new company will be organized, making it a strictly local affair Some of the most prominent business men of Chillicothe will be interested.

POINT ROCK, OHIO.—The Point Rock & Wilkesville Telephone Company has purchased the Dane line, from Oreton to Wilkesville, from the McArthur Telephone Company, and will connect with this company at Oreton. The company will give service in Point Rock, Wilkesville, Vales Mill, Minerton, Hawks, Radcliffe, Oreton, Zaleski, Lone Star, Balen's Mills and Carpenter. The officers are L. W. Calvin, president; W. J. Beckley, secretary and treasurer. The capital stock is $4,000, and the company will begin operation on May 20.

PERSONAL

LAFAYETTE, IND.—Baird Shields has resigned his position as assistant superintendent of the Lafayette Telephone Company, and goes to St. Louis, where he has accepted a position with the Kinlock Telephone Company. Walter Swanington has succeeded Mr. Shields as assistant superintendent.

KEOKUK, IOWA.—The Iowa Telephone Company, operators of the Bell system in Keokuk, want a franchise for putting the telephone wires under ground in the business district of Keokuk.

The committee of the whole council met recently with C. F. Hall, superintendent, and F. B. Gleason, special agent of the company, who came down from Davenport, and the matter was gone over.

The company states that in case the ordinance is passed that it will likely put up a two-story brick telephone exchange, and is ready to start at once putting its wires under ground and having them all in the conduits before winter and the new building built and occupied within a year's time.

DULUTH, MINN.—Bonds for the Zenith Telephone Company and the Duluth Telephone Company are being drawn up by City Attorney Mitchell, and as soon as they are completed and filed the city engineer will issue permits to those companies to begin work on the conduit systems for their underground wires, which will take the place of the overhead system in the business section of the city.

GETTYSBURG, PA.—The telephone service in this place and throughout the county is to be improved by establishing an underground system. A civil engineer, representing the United Telephone and Telegraph Company, which operates the local system, was here last week looking over the ground, and decided that such an improvement would be a great advantage as well as a profitable one to the company.

MISCELLANEOUS

SULLIVAN, IND.—At a meeting of all telephone company representatives in this county here arrangements were made for the installing of a complete county service. The agreement is a result of a conference that was held between the proprietors of the Sullivan Telephone Company, W. W. Harbough and W. T. Malott, of Malott, and the representatives of all other county lines.

CLEVELAND, O.—A special meeting of the stockholders of the Cuyahoga Telephone Company will be held at the offices of the company in the Electric building, Thursday, May 21, to consider the proposition of reducing the capital stock of the company and the par value of each share, and to consider the further question of increasing the capital stock by the issuing of preferred stock.

BEAVERDAM, WIS.—The telephone companies of Columbia county have organized a county telephone association. The object of the association is to make a basis of rates between the several companies using each others' lines. W. H. Little, of Portage, is president of the organization, and F. Smith, of Pardeeville, secretary and treasurer.

New Construction in the Field

HOT SPRINGS, ARK.—C. E. Stinson, of Memphis, Tenn., president of the Memphis Telephone Company and general manager of the Memphis Long Distance Telephone Company, is in Hot Springs, accompanied by J. S. Warren, general manager of the Memphis Telephone Company. They are negotiating with the Little Rock Telephone Company to put in a through long-distance line from Memphis to Little Rock and Hot Springs.

GERMANTOWN, ILL.—The Vermilion County Telephone Company will establish a system in Germantown, the work having already begun.

LEBANON, ILL.—The Lebanon Telephone Company is building a line to Summerfield and will establish a local exchange in that village.

OREGON, ILL.—The Ogle County Telephone line will be extended to Adeline some time this summer.

ANGOLA, IND.—The Farmers' Telephone Company will soon begin the work of putting in the local exchange.

MILFORD, IND.—L. M. Neher, manager of the Royal Telephone Company, is installing an exchange in Leesburg.

REDCLOUD, IND.—The Knox Telephone Company will extend its lines to this place by way of Alice, and will connect with the Mt. Carmel company at Little Rock.

SULLIVAN, IND.—At a meeting of the directors of the Sullivan Independent Telephone Company it was decided to extend lines to all points in the county.

AMERICUS, KAN.—Paul Troutman, manager of the Comiskey Telephone Company, expects to commence work on the local system for Americus very soon.

PRAIRIE CENTER, KAN.—Another telephone line is being erected to Prairie Center. Representatives of the Gardner, Eudora, Prairie Center, De Soto and Olathe-Prairie Center telephone companies held a meeting at Olathe recently and decided on this course.

HILLSBORO, MD.—The Old Dominion Telephone Company will construct a line from Hillsboro to Harper's Ferry. C. C. Gaver, treasurer of the company, is in charge of the work.

ASHFIELD, MASS.—Work has been begun on the extension of the Heath telephone through Buckland to Ashfield.

PITTSFIELD, MASS.—The Berkshire Telephone Company will begin work in Pittsfield within six weeks. Arrangements have been made by the city for the locations of conduits.

HERMOSILLO, MEXICO.—Florencio E. Montevorde, who secured a concession from the city some time ago for a telephone system, has interested Nogales, Ariz., capitalists in the project, and a system will be built.

ATWATER, MINN.—The Atwater Telephone Company is about to begin work on repairing its system. The poles will be replaced by much larger ones and other improvements will be made. Albert Hedberg, of Gennessee, will have charge of the work.

HARRISON, MINN.—The Eastern Union Telephone Company, which has a line from Atwater to New Paynesville, via Harrison and Irving, will extend its line to Grove City.

TIPLERSVILLE, MISS.—The Southwestern Telegraph and Telephone Company has just completed full metallic lines from New Albany to Holly Springs, where it will connect with the Memphis Long Distance Telephone

THE WEEK'S MESSAGES—Concluded.

Company, of Memphis, Tenn., which will have its line in Holly Springs in about sixty days. The Southwestern company has purchased a new Stromberg-Carlson switchboard for its exchange at New Albany. R. J. Shannon is general manager of the company.

CANTON, MO.—The Lewis County Telephone Company has four lines between Canton and Monticello, and in the past three months has put in over sixty telephones on its farmers' line, with orders still coming in. Over its lines communication can be had with over 1,000 farmers in the five northeast counties and long-distance service with all the principal cities of the country.

MEMPHIS, MO.—The Scotland County Telephone Company met at the court house in this city recently. The meeting was called to order by President C. M. Moore, with J. L. Tennant as secretary. A motion was carried that the officers be made a committee to ascertain the cost of running lines into this city and to also get prices on a switchboard. The name of W. B. Evans, of Granger, was added to this committee. The following gentlemen are officers of the company: President, C. M. Moore; vice-president, W. F. Adams; secretary, J. L. Tennant; treasurer, M. M. Myers; corresponding secretary, A. C. Browning.

ST. LOUIS, MO.—The Kinloch Telephone Company has finished its long-distance line from St. Louis to Montgomery City. From that place the LaCrosse Telephone Company will bring seven circuits into Mexico for the Kinloch company, which contracted with the Mexico company for city connections.

SAVANNAH, MO.—The directors of the Andrew County Mutual Telephone Company met in Savannah recently and made arrangements for connection with mutual lines in adjoining counties. Arrangements were made for enlarging a number of switchboards, as at several points in the county all the drops are in use, including Savannah, where more drops must be added.

TROY, MO.—The Farmers' Telephone Company will build a line from Marling to Olney.

BLOOMINGTON, NEB.—The Bloomington Telephone Company will extend its line to Naponee.

FALLS CITY, NEB.—The Falls City Telephone Company has completed a new line northwest of town which serves twenty-two patrons, and one north of town serving twenty.

BRIDGETON, N. J.—The Inter-State Telephone Company has commenced work, rebuilding its system here. New offices have been fitted up, and a switchboard of the latest design is to be placed in position.

LEBANON, N. J.—The Lebanon Telephone Company is erecting poles in Whitehouse Station.

DUNKIRK, N. Y.—The Lake Erie Fast Line Traction Company will install a complete telephone service. Each car will be provided with a telephone connection with a long portable wire with a hook on the end. An ordinary telephone wire will be stretched along the trolley line poles and connection can be made by the hook.

ITHACA, N. Y.—A contract between the Ithaca Telephone Company and the Danby company has been signed for a line from here to Danby.

NEW LISBON, N. Y.—The extension of the lines of the New Lisbon Telephone Company from Mt. Vision to Milford has been commenced.

SPENCERTOWN, N. Y.—Work on the Spencertown co-operative telephone line is being pushed.

BUCYRUS, OHIO.—Manager Unger, of the Bucyrus Telephone Company, announces the completion of the rural telephone line in Liberty township, and says that work will be commenced immediately on the line running south of the Wyandot road.

MIDDLETOWN, OHIO.—The United States Telephone Company, Cleveland, has begun the construction of a trunk line between Middletown and Hamilton.

PENNSVILLE, OHIO.—The People's Telephone Company is building a telephone line from Pennsville to Westland.

BEDFORD, PA.—The Bedford-Fulton Telephone Company has decided to build its line as soon as possible. The first twenty-five miles of the system will cover the territory of Clearville, Gapsville and Breezewood.

COCHRANTON, PA.—David Beringer, treasurer, and Thomas McMasters, secretary, of the Cochranton Telephone Company, are making arrangements to build to Hadley and Sheakleyville.

MONTROSE, PA.—The Montrose Telephone Company is extending its line from South Montrose to Elk Lake, East Rush and Auburn Corners.

SNYDERSVILLE, PA.—The Pohoqualine Telephone Company held a directors' meeting at Snydersville recently and discussed extending the trunk line from Brodheadsville to Wind Gap.

SIOUX FALLS, S. DAK.—J. C. Bordner, of Rockford, Ill., is in the city to superintend the construction of the long-distance telephone line to be built by the Citizens' Telephone Company of this city. Mr. Bordner was formerly in the employ of Jones & Winter, telephone engineers.

ANDERSON, TEX.—A. B. Foster, of Huntsville, the new manager of the Anderson Telephone Company, is having all the lines repaired.

WEST TOPSHAM, VT.—The Corinth & Bradford Telephone Company will soon build a line from West Topsham to Groton.

SMITH'S CROSS ROADS, VA.—The Farmers' and Merchants' Telephone Company has about completed the fourth division of its lines connecting this place and Bracey. Arrangements are being made to extend the line to South Hill, thence to Union Level and Boydton, to connect with the Virginia-Carolina Telephone Company.

FRANKLIN, W. VA.—The Pendleton and Western telephone line will soon be completed to Davis and Elkins.

OSCEOLA, WIS.—The Minnesota Mutual Telegraph and Telephone Company will put in an exchange here. The company expects before a month to have a line completed from Grantsburg to Frederic, and to Balsam Lake, some time during the summer.

PLEASANT PRAIRIE, WIS.—The Pleasant Prairie Telephone Company has begun the construction of a line between Eastern Pleasant Prairie and Kenosha.

DETROIT TELEPHONE SITUATION

JUDGE SWAN, of Detroit, Mich., has denied the motion by the Central Trust Company, of New York, to consolidate its suit of foreclosure against the Detroit Telephone Company, with the foreclosure proceedings begun by the Old Colony Trust Company, against the Michigan Telephone Company. The judge gives as his reason for denying the motion the fact that the mortgage to the Old Colony Company was given before the Michigan Telephone Company purchased the Detroit Company's property and equipment, and covered only the property owned at that time by the Michigan Company. If the Old Colony Company has any right or interest in the property acquired by this purchase, which it is not now asserting, and which is expressly repudiated in the bill of complaint, its interests are subject to the lien of the Central Trust Company.

The effect of this decision will be that the Central Trust Company will now go ahead in its own foreclosure suit and have a receiver appointed to take possession of the assets of the old Detroit Telephone Company. The Union Trust Company, as receiver, does not care for this property, and recently made application for authority to issue $50,000 worth of receiver's certificates to raise money to replace the wires the Michigan Telephone Company is using that formerly belonged to the Detroit Telephone Company.

TRADE NOTES

THE NORTH ELECTRIC COMPANY, of Cleveland, Ohio, has filed an amendment to its articles of incorporation, increasing its capital stock from $200,000 to $250,000.

W. H. ANDERSON & SONS, Detroit, Mich., have a pole-raising wagon on the market that is designed to greatly reduce the time and expense of setting telephone poles. The wagon is provided with a steel boom and hoisting winch. Poles of any length up to seventy feet can be quickly and easily hoisted and set in position by this wagon, much more cheaply than the work can be done by the ordinary methods. They have issued a little booklet which tells all about this wagon, and also describes many of the other construction tools they manufacture. It will be sent upon request.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, of Chicago, Ill., and Rochester, N. Y., have about completed the installation of a 4,800 ultimate capacity lamp line multiple switchboard with 2,400 lines present capacity, for the Interstate Telephone and Telegraph Company, at Springfield, Ill. The company has nearly completed their underground system, which extends over the major part of the city. The Stromberg-Carlson Company has recently sold telephones and material to the Yantisville Telephone Company, Yantisville, Ill., and the O'Dell Farmers' Telephone Company, O'Dell, Ill.

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POSSIBILITIES OF THE POST-OFFICE TELEPHONE

By Hon. ROBERT J. WYNNE, First Assistant Postmaster-General

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Hon. ROBERT J. WYNNE.

IN connection with the system of rural free delivery, the country telephone throughout the United States is used far more than most residents of our cities imagine. In many prosperous sections of the West nearly every farmer has a telephone in his home. As rural letter-carriers are permitted to act as news agents, carrying the daily papers to country subscribers, the farmer is enabled to consult the market quotations as early in the day, often, as a metropolitan broker. It frequently happens that a ranchman about to ship carloads of cattle to the stockyards discovers by his morning paper, brought to his door by the rural carrier, that the market is temporarily gutted. Thereupon he rings up the postmaster for later information. Connecting finally with the nearest telegraph station, the cattle raiser receives over his telephone as satisfactory a service in regard to the rise and fall of the market values of live-stock as is enjoyed by the most alert buyer in the centers of business. The cattleman, therefore, holds back his herd until his advices inform him that an auspicious rise in the market warrants immediate shipment. In many individual instances the saving accruing to the cattle raiser through information of market conditions has exceeded the total annual cost of rural delivery service over the entire route in which he lives.

WHERE THE TELEPHONE WILL HELP THE MAILS.
A Bad Rural Delivery Route in New York State, showing the mail wagon stalled.

Similar benefits are derived by the raisers of ordinary farm products. Telephone communication, supplementing the rural delivery of market reports, frequently gives information of a sudden and sharp rise in values, and the farmer can call up his city dealer and arrange for an immediate shipment at far more advantageous rates than could have been secured in the ordinary way. It is no longer necessary for the farmer to consign his grain, hay, fruit or vegetable crop blindly, trusting to the exigencies of a mysterious market and the tardy reports of a commissioner. The American farmer is becoming more and more a vital and intelligent factor in the daily transactions of the business world.

From this service to the telephone transmission of special rural delivery letters is a logical step. In the project as outlined by Senator Fairbanks, of Indiana, it is designed to have printed a special telephone stamp, which, affixed to a letter, would indicate that the postmaster at the nearest distributing station should open the envelope and telephone the contents to the addressee. In many districts such a service would involve no additional expense, inasmuch as telephones put in by contract at a stipulated annual rental could be freely utilized for this special telephone service. A rural telephone exchange in many communities is controlled by the farmers themselves, and the transmission of telephone mail matter over such systems could be arranged without cost to the government. However, to cover possible expense, the plan would be to impose a charge, as in the case of special delivery letters, which require a ten-cent stamp, in addition to regular postage.

The telephone would make special delivery of mail matter practicable in the country, and whoever has watched the progress of rural delivery and noted the insistent demands for the service from all sections of the United States, will not be surprised to find the rural communities now enjoying ordinary mail facilities asking for a telephone service that will bring them into more immediate communication with correspondents.

During the last fiscal year 7,762,685 special delivery letters were handled in the United States. Of that number 6,786,221 were distributed from free delivery postoffices. The relatively small number credited to minor offices reveals the great field of opportunity for development of this important service. In many localities where it would be impracticable to install special letter messengers, it would be quite feasible to transmit the contents of the special letter by telephone, thus giving the farmer as modern a mail service as that enjoyed by the residents of a city. The difference in principle between sending a messenger on a bicycle to carry a special letter to the addressee in the city and that of empowering the postmaster to open a similar missive and transmit its contents by wire, is not great enough to give point to any economic objection to the plan. It is merely the logical extension, through modern appliances at hand, of a system which, in cities, has been found to be virtually indispensable.

That this project of increased adaptation of the telephone to the postal service of the United States will grow rapidly in favor, may be inferred by reference to the rate of development of rural delivery itself. There was opposition to the system at first, not only from cities, but from the very districts to be benefitted. Six years ago there were but forty-four rural free delivery routes in operation, and the Congressional appropriation for them was only $40,000. At the end of the last fiscal year (1902) there were 8,466 routes in operation, and the appropriation for them was nearly $4,000,000.

Every new rural delivery route means increased opportunities and demands for telephone service. The desire to keep in touch with the vital movements of trade and finance has quickened the whole continent. The daily delivery of letter and morning papers to the door of the farmer and the ring of the telephone in his house has given a new significance and impetus to husbandry. The farmer has become a man of affairs. The telephone, reinforcing the rural postal facilities, not only contributes to his welfare materially, permitting him to control the movement of his crops, but it has a far-reaching sociological influence. The farmer, through these mediums, is given social advantages. He and his family are no longer isolated. The desire of the younger generation to abandon farm life to embark on capricious undertakings in the city, is being overcome by facilities which are adding a new charm to rural life. Rural free delivery and the telephone have abolished the frontier.

Progress from the condition of the telephone as an independent auxiliary to an essential part of the system seems inevitable to those who have given close study to the subject. Even were it to involve an expenditure over the government telephone receipts, there would be ample argument in favor of the innovation. The plan of postal administration is not to view deficits with alarm. Whenever receipts approximate expenditures, the policy is to increase facilities, so as to bring the service, at decreasing cost, to a greater number of people. As a matter of fact, however, and one of absorbing interest to students of political economy, it has been disclosed that the cheapening of cost to the public and the wide extension of facilities does not result in a corresponding deficit, as might be expected. Although rates of postage on various classes of mail matter have been steadily decreased, and the service constantly augmented at great expense, the deficit for 1902 was $2,961,170 as against $6,050,371 ten years before. In that year, 1892, while the deficit stood at the sum mentioned, the total expenditures were only $76,080,846, as against $124,809,217 for last year. Thus, while increased facilities involve greater expense, the revenues are so stimulated by the extended service that the deficit grows less instead of greater.

The introduction of the telephone, therefore, even at considerable expense, would doubtless soon decrease instead of increase the total postal deficit.

It is reasonable to assume that just as the agriculturists and cattle raisers have seized with avidity upon the increased postal facilities as now ordained, they would hasten to patronize a telephone system for the transmission of special letters. A special delivery letter mailed in Washington Saturday afternoon addressed to a person in New York City will be delivered in the metropolis Sunday morning at the latest. But a letter mailed simultaneously addressed to a farmer midway between Washington and New York must wait in the local country post office until Monday morning. Now if the letter bore a special telephone delivery stamp and the postmaster were authorized to open the envelope and telephone its contents to the addressee, if he had a telephone, or to the nearest neighbor or station enjoying that service, there would be a saving of from 36 to 40 hours in the delivery. The desirability of such a system will be obvious to everyone who realizes the great value of time in modern transactions.

In many districts, as stated, the cost to the government from this added facility would be nominal and often nothing at all. Where it would be necessary to install wires under special contract, the special telephone stamp in the majority of instances would cover the cost of telephone transmission.

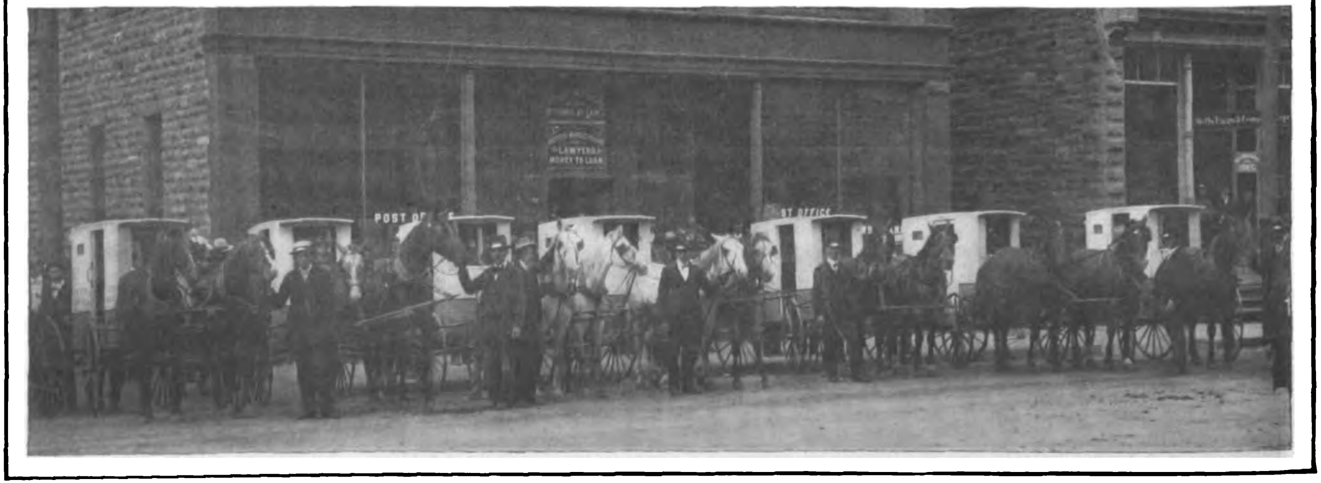
With companies operating in the field, contracts could doubtless be secured which would be equitable to all concerned. The advantages of sending letters to country correspondents by telephone are obvious when the transmission of the communication would otherwise be delayed by holidays. It would be equally valuable on ordinary days, inasmuch as the average time the rural carrier requires to cover a mile is sixteen minutes. On thoroughly established twenty-five mile routes, it is six and a half hours or more from the time of starting before the final delivery of the day is made. In the case of special letters to be transmitted by wire the postmaster could, within a minute or two of opening the letter, communicate its contents to the most distant farmer on the telephone circuit. At present the cost to the government of rural delivery averages eight and a half cents a mile. It will be seen, therefore, that the outlay for telephoning special letters would be, comparatively, a matter of slight expense.

In Senator Fairbanks' amendment to the post office bill, it was designed to divert $25,000 for an experiment in rural telephone free delivery. In advocating the measure, Senator Fairbanks said:

> "The proposition is a very plain one. It can be easily understood. We are all familiar with the rural free delivery service as it has expanded during the past six or seven years. There is no branch of the service that is so acceptable to all the great farming communities of the country as that service, which daily brings the United States mail to the door of the farmers. There was a great deal of opposition to that service in its infancy. I recollect that within six years past Senators rose and protested against rural free delivery, believing that it was but the beginning of a raid upon the Treasury of the United States. It was asserted from time to time that the service was impracticable, that it was impossible, but I believe it is the common judgment of all in both Houses of Congress and throughout the country, that the service is a practicable service and an indispensable service. In many sections of the country the telephone system radiates and ramifies everywhere. In some sections of the West there is scarcely a farmer who has not a telephone in his own home, and those who do not have it expect to have it in the not far distant future. I venture the prediction that it will only be a comparatively short time when substantially all the farmers and all the rural neighborhoods will have a complete telephone system."

He called attention to the fact that the government has no telephone system of its own, and that it was not contemplated nor desired that it should have one, but that where farmers did not have their own exchange, the Postmaster General could arrange with the local telephone company to handle the special delivery business, just as he now may arrange with a railway for the carrying of mails.

That this amendment was not incorporated in the bill is merely



RURAL FREE DELIVERY WAGONS STARTING FROM THE MASON CITY, IA., POST OFFICE.

The Special Telephone Delivery Letters are Expected to be an Important Factor Here, as Farmers' Lines Radiate in all Directions.

an incident in the development of the plan. Later the Senate passed a resolution directing the Postmaster General to inform that body to what extent and in what manner the telephone is used in the collection and delivery of special delivery mail matter, and whether, in his opinion, special rural telephone delivery of mail matter is desirable and feasible.

In answer thereto, that honorable body was informed that during the year 1901-2 postmasters at the following offices were authorized to adopt the system of collection and delivery of local special delivery mail matter in response to telephone and other calls: Buffalo, N. Y.; Gardner, Mass.; Macon, Ga.; Saginaw West Side, Mich.; Carthage, Mo.; Dayton, Ohio; Syracuse, N. Y.; Concord, N. H.; Fort Scott, Kans.; Lowell, Mass.

It was explained that the service is also in use in the post office system at Washington, D. C., where a person who desires to send a special delivery from one part of the city to another deposits the same at any station, with ordinary postage properly prepaid and special delivery stamp. The clerk in charge of the station calls up the main office and requests a messenger, who goes to the station, receives the letter or package, and delivers it direct to the addressee. This service can only be used at such offices as have contracts or arrangements for use of telephone without charge. The practice at the Washington office is, that at the end of each day the clerk in charge of the station is required to furnish the main office, on a blank provided for the purpose, a statement of all special delivery matter dispatched in this manner from the station. During the time the service has been in operation it has been appreciated by the public and used to a considerable extent for local mail.

In reference to the use of telephone for delivery of rural mail matter, the Senate was advised that it is felt to be practicable to use the telephone in connection with the rural free delivery service, especially in those counties or communities in which the service is well established and the telephone generally used by the farmers or by country stores.

In the furtherance of business between main post offices and between their substations, the telephone plays a very important part. Where the telephone is invoked to hasten special delivery, very satisfactory results are obtained. In Washington, D. C., the post office rents telephones for its substations, including those installed in drug stores transacting postal business. The moment a special delivery letter is deposited, the division at the central office having charge of that service is called up, and, as stated, a messenger boy on a bicycle is immediately sent for the letter. It is entered in his book, and he starts forthwith, not for the post office, but direct to the addressee. For the sum of ten cents, therefore, a letter may be sent without delay to any part of the capital. For the quarter ending March 31, 1903, 62,820 special letters were delivered by the Washington post office, and for this service the messengers, who are not permitted by law to make more than $30 a month, were paid $525.60. The Postmaster General in his report for the fiscal year ending June 30, 1901, says:

> The value of special delivery stamps used in special delivery matter was $713,326.30, and the amount paid for making deliveries was $542,128.01, leaving a profit to the Government on the year's business of $167,727.73, after deducting $2,657.37 expended for car fare of special delivery messengers in emergent cases, under authority of the act of Congress of March 1, 1899, and $813.19, the cost of manufacturing the stamps. Under authority of act of Congress approved March 1, 1899, providing an available fund of $10,000 a year out of the revenue arising from special delivery business for car fare of special delivery messenger in emergent cases where immediate delivery in the usual manner is impracticable, allowances for car fare were made during the year to the amount of $2,852.75, of which $2,657.37 was actually expended. The profit to the Government from last year's special delivery business was $147,820.95, and from this year's special delivery business, $167,727.73; an increase of $19,906.78, or 13.46 per cent.

That the use of the telephone in connection with this service in some of the large cities greatly increased the volume of special delivery letters is well known. Yet although the telephone has already become an important subject to postal transactions, the total sum expended for telephones in post offices throughout the United States for the fiscal year ended June 30, 1902, amounted only to $50,558.90. This annual rate is on the increase, but it is manifest that a sum a trifle over $50,000 is very small in a total of annual postal expense aggregating nearly $125,000,000.

We have not passed the initial stage in the use of the telephone in the postal business of the United States. In municipal, interurban and far rural transactions of the post office system, a field of telephone operations of almost unlimited extent awaits exploitation. Just as the special delivery service is a source of increased revenue to the government, so could increased telephone facilities be made to yield federal dividends.

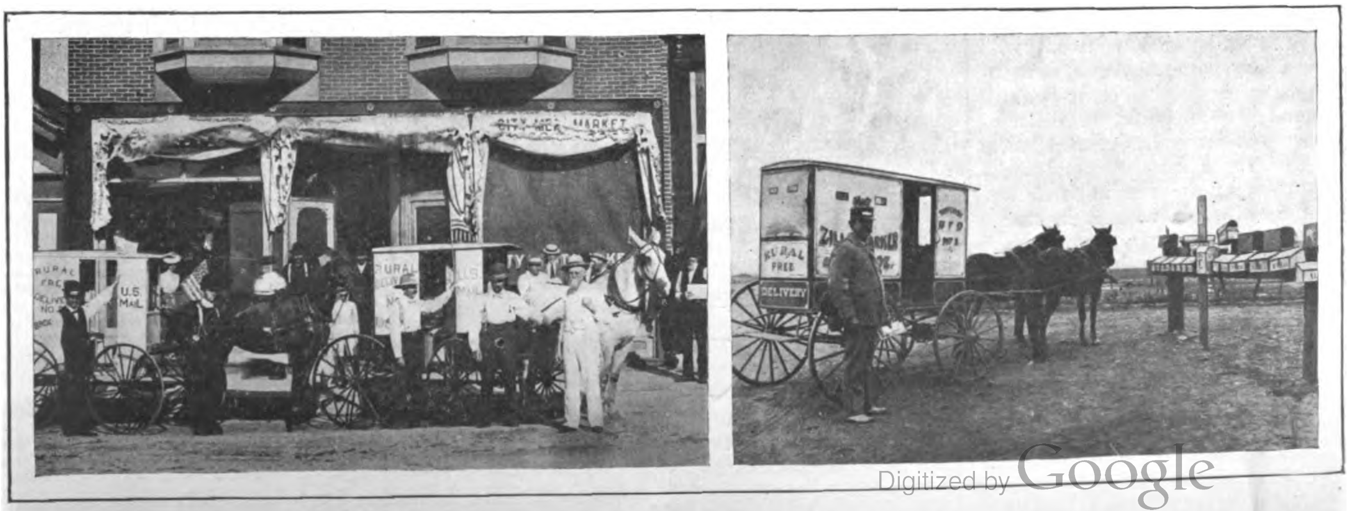
It is impossible to picture the American people, either in whole or in part, denying themselves permanently the material and social benefits to be derived from the application of so practicable a thing as the postal extension of the telephone system. As a rule, telephones are now allowed at post offices having annual gross receipts of $30,000 and upwards, but there are exceptions to this rule, and in a few cases telephones have been installed in much smaller offices. The entire field is a comparatively new one, opening up a world of opportunity for suggestion and enterprise.

In proposing the introduction of the telephone in postal affairs no departure from fundamental postal principles is considered. It is merely a vital and modern extension of the service. The telephone will simply give a new emphasis to the potent benefits conferred already upon the country population of the United States. If rural delivery keeps the farmer in close relations with the active business world, the telephone will make that relationship still more intimate.

It is plain to those who study the tendency of modern progress that the telephone is to become an immensely important factor in postal transactions. John Quincy Adams, in a reference to postal progress, rejoiced that he had lived to see mail carried to many post offices throughout the United States as often as once a week, and to a favored few offices as often as once a day! Steadily the government has taken advantage of new inventions. Steam, electricity and compressed air are employed to expedite the transmission of mail matter, and it is reasonable to assume that the telephone will supplement all these appliances.

It may not be too sanguine to predict that eventually a citizen from his residence will be authorized to ring up the central post office for a messenger, entrust to him a special delivery letter, and have it carried immediately to the addressee.

BROOKSTON, IND., POST OFFICE AND SINCOE STATION, ON THE NORTHERN PACIFIC.
The Suggested Telephone System Would Save from Six to Eighteen Hours at these Stations on Special Delivery Letters.



A COMBINATION CABLE, POLE AND TELEPHONE NUMBER RECORD

By William H. Hyde.

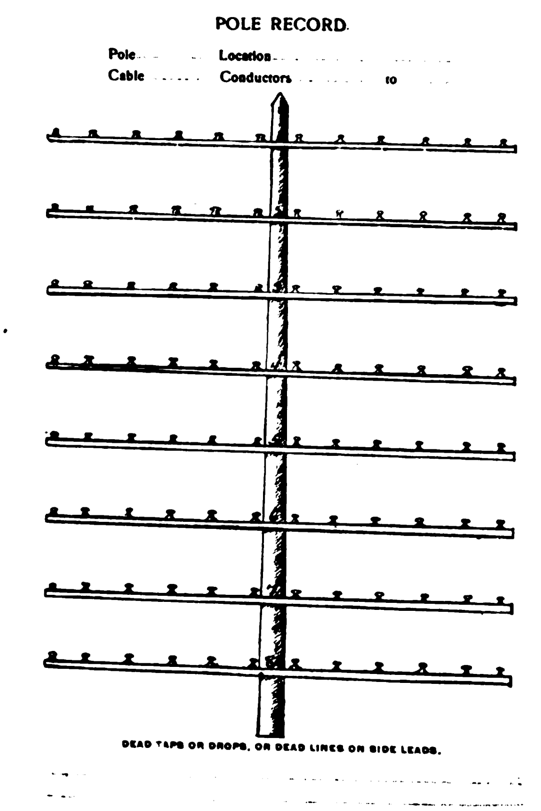
To keep track of cables, conductors, pole and telephone numbers many schemes have been devised. One that is both practical and easily understood is given herewith for the benefit of those that have not already a satisfactory record. The books necessary are: (1) Cable Record—50 pages (see Fig. A for sample page); (2) Pole Record—50 pages (see Fig. B for sample page), and (3) Telephone Number Record—100 pages (see Fig. C for sample page). These three records are all bound within *one* cover, making a book of 200 pages. (This book can be made larger if necessary.)

CABLE RECORD

CABLE NUMBER 1 (NOTE: USE HARD PENCIL.)

Conductor Nos.	Pole No	Telephone No.	Class.	Location of Station on Line farthest from Central Office.
1 and 2	1-2-3-4	5001	4-Party	800 Jackson Street
3 and 4	1	240	Single	474 Jefferson Street
5 and 6	1	345	Single	480 Jefferson Street

FIG. A.—FIFTY PAGES, 28 LINES TO PAGE.


POLE RECORD.

Pole ...... Location ......

Cable ...... Conductors ...... to ......

FIG. B.—FIFTY PAGES.

The cable record should be kept as follows (use hard pencil): Number the cables consecutively, beginning with No. 1. Under *Conductor Numbers* enter the numbers of the conductors in numerical order, as shown on sample sheet (Fig. A). If a pair of conductors head up on more than one cable pole, as in the case of party lines, note under *Pole Number* the numbers of the different cable poles the conductors are multiplied to. (See Fig. A.) Under *Telephone Number* note the subscriber's telephone number; in the case of a party line, give the party line number—for example: No. 5001 would indicate party line No. 500, the last figure indicating the station; No. 5001 being station one, No. 5002 station two, etc. Under *Class* note single, 2 party, 4 party, etc., as the case may be. It is a good plan to letter the different classes of service, as *A, B, C, D,* etc. Under the last heading note the location of the station farthest from the exchange, so that in case of a party line you may know at a glance how far out the line has been extended.

The pole record needs very little explanation. Number the cable poles consecutively, starting from the exchange with No. 1, fill in the numbers and the location of the cable poles on the records. Also the number of the cable and conductors headed up or multiplied on each pole. Show on the diagrams the arm and pin numbers the different conductors take, for example: No. 1 and 2 conductors may take 11 and 12 pins on the third arm; if so, fill in over 11 and 12 pins of the third arm the figures 1 and 2, and so on. If desired the telephone number may be noted between the two conductors a little above the conductor numbers.

As a matter of record, space has been provided underneath the pole diagrams for dead taps or drops and dead lines on side leads for ready reference.

The telephone number record should start with No. 1 and be numbered consecutively. If selective party lines are in use the numbering of this class of service is best handled as follows: For an exchange of 2,000 or less, run all this class of service to one section of the switchboard, selecting a section on which the numbers will be high enough so as not to conflict with the regular telephone numbers. The 500 board is a good section to use. Number the lines as follows: No. 500 to be used for 5001, 5002, 5003, 5004; No. 501 to be used for 5011, 5012, 5013, 5014; No. 502 to be used for 5021, 5022, 5023, 5024; No. 503 to be used for 5031, 5032, 5033, 5034, and so on, the first three figures indicating to the operator the line number and the last figure the number of the station.

The following specific instructions should be pasted on the inside of the front cover, for the guidance of the Exchange Managers:

This record of subscribers' lines arranged in numerical order of Cables, Poles and Telephones, will, if kept properly written up, give you a very ready reference in locating dead individual lines, also partially filled party lines or dead drops, from either a junction pole to a side lead or from pole on main lead to a former subscriber's station. It also furnishes quickly, for the information of the line troubleman, the Pole, Arm and Pins the subscribers line in trouble, is on.

When issuing a "Connection" or "Change" order for a "one party line" subscriber, you should note, on the order, the Conductors of the Cable you wish the lineman to take, provided the record shows there are no dead available wires on that run. If the New Subscriber is of the two or four

TELEPHONE NUMBER RECORD.

Telephone No.	Class.	Cable.	Cond's.	Pole.	Arm.	Pins.	SUBSCRIBER'S NAME AND ADDRESS.

Fig. O.—Twenty-five lines to page—100 pages.

party class, note on the order the nearest partially filled party line of the same class onto which he should be connected.

If in order to cut a new line in straight, i. e., to have it on the same Arm and Pin from the Cable Box to the Subscriber's station, it is necessary to move an old subscriber's line, memorandum of the new arm and Pins the old subscriber is moved to, should be made on the "Connection" or "Change" order, and this record corrected to agree.

If all party lines in a district in which a contract for a new Party line subscriber has been secured, are filled and the subscriber refuses to subscribe to the one party class of service, *you may, if the neighborhood is promising, or for other reasons you think it advisable, build a new line from the cable pole.* Until new subscribers of this class in his neighborhood are secured, however, he should be bridged in the Central Office to some other partially filled party line, the idea being to furnish all subscribers the *class* of service they are paying for from the date of their *installation.*

After the "Connection," or "Change" order is completed, careful record must be made of the location of the line, in the three parts of this record.

When a subscriber's telephone is taken out, or for any other reason his conductors or drop become vacant, proper notation should be made in this record.

It is an excellent plan, also, to have a physical map of the Exchange, showing the streets, length of blocks, location of cables, size, etc., location of cable poles and any other desirable information.

If an underground system is in use, map should show location of ducts and manholes. An office record should also be kept of the manholes, giving the details of each manhole. This record may be kept either in card or book form. The manholes should be numbered for reference, just as the cable poles are. A card for for manhole record is shown in Fig. D.

ENGINEERING DEPARTMENT.

No. *To No.* *M. H.* *Ft. Distance*

Kind of Duct	No. of Lengths	Cap of Each	No. of Feet	Location of Manhole

Size Cables	No. of Lengths	No. of Feet	Cable Capacity		Description of Manhole
					Walls
			N		Floor
			E		Cover
			S		Width
			W		Length
					Height

Fig. D.—Size of card is 5 inches x 3 inches.

A SCHOOL FOR OPERATORS

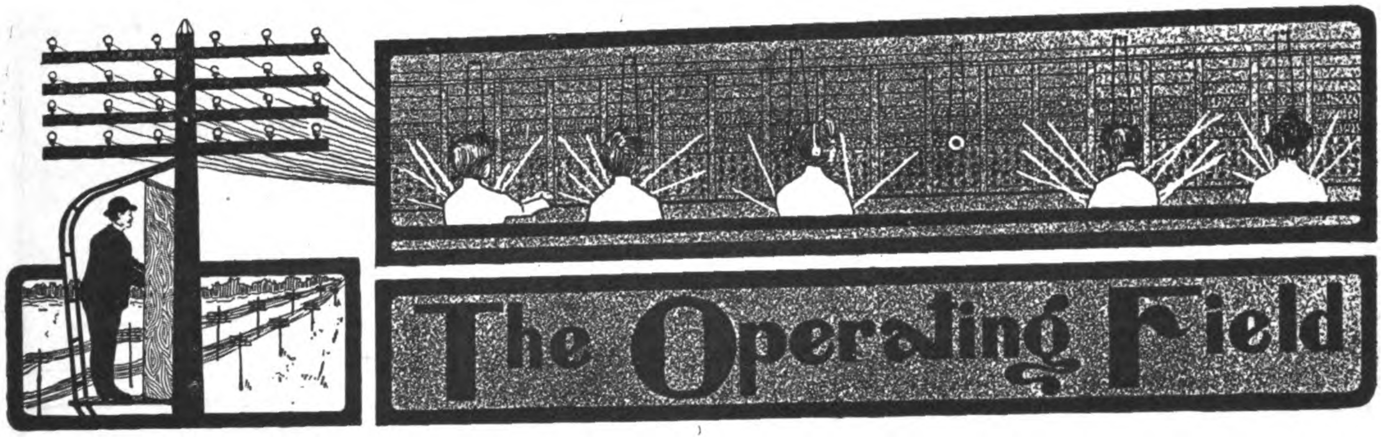
THE success of all Independent telephone companies has rested mainly upon the efficiency of their service over the service furnished by the Bell companies. Polite and rapid operators and up-to-date apparatus and the best management, provided all other things are well looked after, will bring success to any telephone company. To obtain efficient operators is a problem that should receive the most careful attention of every manager. There is but one way to do this effectually, by discipline and training. To this end a plan that has been in operation in New York City for several years, offers a very good suggestion. It is a school maintained by the telephone company for the making of telephone operators.

This New York school for operators is located in one of the exchanges. It is presided over by an operator of long experience and proven merit. She has half a dozen or more assistants, all operators who have had long and careful training. Applicants for positions as operators must apply to this chief instructress between the hours of nine and twelve in the morning. She puts them through a rigorous examination. This examination is not based upon what the prospective operator has learned in school, although, of course, that is a consideration. The applicants must, in the first place, have good sight and hearing, must pronounce clearly and distinctly, have a fairly strong, clear voice, write a free hand, appear to be fairly bright and alert and in good health and present a neat appearance. They must also be not younger than seventeen nor older than twenty.

Applicants meeting all these requirements are admitted to the school on probation. The term is usually four weeks. For this schooling the applicant is paid at the rate of $3.00 a week and is also provided with coffee, tea or milk at luncheon. The first step is teaching the theory of operating. This is done in a large class room, the walls of which are covered with maps showing the various keyboards, the location of the different exchanges, how connections are made between these exchanges, the names and situations of various suburban places, and how long distance connections are made. During a lesson which lasts an hour or more, pupils are expected to make notes and rough drawings of the special features shown on the maps. After a lesson, they are carefully examined in what they have just studied. If a girl shows but little aptitude for learning after a lesson or two, she is dropped from the roll.

Those that show promise, however, are sent in relays of fourteen to another room, where there is a switchboard the exact duplicate of the ones in the exchanges. The lines are run to chief operators' desks, where the instructresses call up the pupils and have them make all kinds of connections, local, trunking, long distance, toll, etc. They are taught everything here that is necessary in real operating, and are thoroughly drilled in accuracy and speed. They are also taught not to lose their tempers, and to be polite under all circumstances.

After graduating from this school, the operators are qualified as full-fledged operators, and during the less busy hours, they do real operating at the regular exchange switchboard.



A UNIQUE ASSOCIATION FORMED.

REPRESENTATIVES of telegraph, telephone, electric light and other companies maintaining copper wire circuits met in Philadelphia, Pa., recently, and organized an association for the prevention of thefts of wire. Copper wire thieves have been very plentiful of late in Philadelphia and vicinity, and have cost the various companies a considerable sum of money, besides the inconvenience to their patrons.

It was decided to raise funds for employing detectives to hunt down and prosecute the thieves. It was also decided to organize a lobby for securing the passage of a uniform and stringent law in all States against the offense. Junkmen who handle the stolen wire are to be given especial attention, as by watching them it is believed the thievery in greater part can be stopped.

S. E. Weyland, president of the Consolidated Telephone Company, presided at the meeting. Other companies represented were the Keystone Telephone Company and its long-distance branch, the Keystone State Telephone & Telegraph Company; the United Telephone and Telegraph Company, the Bell Telephone Company of Philadelphia, the Postal Telegraph-Cable Company, and the Western Union Telegraph Company. It is the aim of the promoters of this new organization to have every company in the United States a member, so as to entirely stamp out wire thieves.

AN INDEPENDENT PLANT FOR CINCINNATI.

By H. S. O'Brien, *Special Correspondent.*

HARRY B. GATES, for several years secretary of the New Telephone Company, of Indianapolis, Ind., is at the head of a group of Indiand capitalists who are seeking a franchise in Cincinnati, Ohio, for an Independent system. Some of those associated with him are George W. Beers, of Fort Wayne, Ind.; Joseph C. Schaf, president of the American Brewing Company, Indianapolis, and E. I. Fisher, of the Kahn-Fisher Investment Company, Indianapolis. The promoters express the opinion that Cincinnati offers the most attractive of the unoccupied fields for Independent companies. The Bell Company, at the present time, has a monopoly there, one result of which is that residence telephones are $72 a year, as compared to $24 in Indianapolis, and business telephones are $125, against $40 in Indianapolis.

Two franchises independent of the Bell have already been granted by the city. One of these was to the Lawton-Beattie Company and the other to the Fitzsimmons Telephone Manufacturing Company. This latest venture towards getting an Independent foothold in Cincinnati has strong financial backing. The promoters say that before pushing their plans to completion they will insist that at least $1,000,000 of stock be subscribed. It is their opinion that no difficulty will be encountered in securing this sum. Mr. Beers is known as one of the most aggressive telephone men in the country, and Mr. Gates is a most successful organizer and promoter.

Another development in the Cincinnati field during the last week which seems to promise Independent connections with that city at a very early date is an announcement by Philip Fitzsimmons, president of the Fitzsimmons Telephone Manufacturing Company, which owns a franchise in Cincinnati, that a syndicate of twelve Independent telephone companies has been formed to gain toll connections with the city. The connecting lines of the Independent companies, he said, are now completed to within three miles of the end of the Fitzsimmons-Hauss line out of the city. By the first of June a system of uniformed messenger boys will be established to solicit and carry messages to drug stores, and other places, to be transmitted to all points in Ohio and Indiana. The agreement between the twelve Independent lines, he says, is of ten years' duration. Fitzsimmons and Hauss, it is said, recently refused an offer of $50,000 for a four-hour option on their franchise. They say that the Indianapolis syndicate above mentioned is not represented in the twelve-company syndicate. It is known that the Fitzsimmons-Hauss interests have been very active during the last few months in Cincinnati and are busily engaged in stringing new wires. In order to keep this work secret from the detectives of the Cincinnati & Suburban (Bell) Telephone Association, wide publication is given to alleged squabbles between city representatives and the Fitzsimmons company.

OREGON INDEPENDENTS ARE WINNING.

THE Bell Telephone Company is losing ground in Oregon. Independents in the eastern, southern and middle western States are but little acquainted with the situation out in Oregon, Washington and other Pacific Coast States. The success of the Independents there is just as remarkable as it has been in other parts of the country. A good illustration comes from McMinnville, Ore., where the McMinnville Mutual Telephone Company was organized some years ago. It has given such a good account of itself that the Bell telephones have been ordered out of the city offices and a good many others, and the Bell will soon be forced to withdraw entirely from the town.

The following agreement, signed by all the business houses of the town, tells the story:

"We, the undersigned business men of the city of McMinnville, believing it to be to our mutual advantage to use exclusively the telephones of the Mutual Telephone Company, which now has the largest number of subscribers in our city, and is unanimously patronized by our country patrons, believing that we will save at least 50 per cent. thereby, and that the service of the Mutual Company is better than that of the Bell Company, hereby agree that after May 1, 1903, we will discontinue the Bell telephones in our respective places of business."

UNITED STATES TELEPHONE COMPANY.

THE March statement of earnings of the United States Telephone Company has just been issued. It shows a gross earning of $32,151.76, as compared with $27,943.40 for February, 1903, and $22,746.18 for March, 1902. The gross expenses for March were $16,691.29, a decrease of $63.95 over February, 1903, and an increase of but $4,000 over March, 1902. The March statement further shows a surplus for stock over and above fixed charges and taxes of $6,392.10, as compared with a surplus of $2,000 for March, 1902. The figures for the first three months of 1903 are as follows: Gross earnings, $88,722.33; expenses, including taxes, $51,728.42; net earnings, $36,742.84; surplus for stock, $11,937.37.

The company's business throughout the State has increased so rapidly that it has been found necessary to largely increase its facilities, and this condition, together with the opening of new independent exchanges at Dayton, Springfield and Hamilton, have made it necessary for the company to string about 150,000 pounds of hard-drawn copper wire and to build approximately 100 miles of additional pole lines. New pole lines are being constructed from London through to Richmond, Ind., via Springfield and Dayton, and from Tippecanoe City, Ohio, to Hamilton, Ohio, via Dayton and Middletown; also from Chillicothe to Richmondale and from Dennison to Cadiz. The line in course of construction between Dayton and Richmond will furnish direct connection between the United States Telephone Company and the New Long Distance Telephone Company, of Indianapolis, and through them service can be had practically between any points lying between St. Louis and Columbus, as connections have recently been made between Indianapolis and St. Louis.

These additions will very largely increase the revenue of the United States Telephone Company, and undoubtedly before the year is over the company will be earning on a basis of 4 per cent. for the stock. The present extensions are being made out of earnings and the company should spend at least $100,000 more for connections with other toll line companies and for increasing the present service over present toll lines.

NO MERGER IN PHILADELPHIA.

THE Philadelphia Bell Telephone Company has been trying to make capital for itself and injure its opponent since the stock of the Keystone company was placed on the open market, as stated in these columns recently. Hardly had the stock been listed than Bell people started several rumors that the Keystone was to be sold to the Bell. The Philadelphia Trades' League, through its Telephone and Electrical Committee, has made every effort to verify these rumors, but without the least success. President Robert H. Foerderer, of the Keystone Telephone Company, has written a letter to the Trades League, in which he emphatically declares the Keystone is not considering, nor ever has considered, any proposition to merge with any other telephone company. Mr. Foerderer says the Keystone company is handling 80,000 calls per day now, and that the average cost for this service to subscribers is one and one-half cent a call, while the lowest Bell rate is four cents per message.

Accompanying the letter was a schedule of rates, giving comparisons between the Bell charges in 1900 and now and showing that two telephones can now be had for less than the cost of one in 1900. The schedule was as follows:

	Bell Rate 1900. No. of Calls.	Rate.	Add. Calls.	Bell Rate 1903. Rate.	Add. Calls.	Reduction Since Opposition Entered Field.	Keystone Unlimited Service.	Rate
Single line	*	$160	..	†	..	..	Business direct	$80
Single line	800	90	8c.	$69	5c.	$21	Unlimited	..
Single line	1,000	102	7c.	78	5c.	24	Residence direct	48
Single line	1,200	112	6c.	87	5c.	25	Unlimited	..
Single line	1,400	120	6c.	96	5c.	24		
Single line	2,000	144	5c.	120	4c.	24		
Business two party	600	60	8c.	48	5c.	12	Business two party	52
Business two party	800	72	7c.	57	5c.	15	Unlimited	..
Business two party	1,000	82	6c.	66	5c.	16		
Business two party	1,200	90	6c.	75	5c.	15		
Business two party	1,400	98	6c.	84	5c.	14		
Four-party residence	600	45	4c.	..	..	..		
Residence, two party	600	..	..	42	5c.	3	Residence, two party	36
Residence, four party	1,000	57	4c.	..	..	and double	Unlimited	..
Residence, two party	1,000	..	..	60	5c.	service.		

*Unlimited. †Abandoned.

COMPARISON RATE OF ONE AND TWO TELEPHONES.

One Telephone in 1900.		Two Telephones in 1903.		Saving.
Bell unlimited telephone	$160	Bell limited telephone	$69	
		Keystone unlimited	80	
		Total	$149	$11

ALBANY HOME TELEPHONE COMPANY.

THE superintendent's report at the annual meeting of the Albany Home Telephone Company, held recently, showed that there are now 1,836 subscribers to the Albany Independent system, with more than 1,000 additional subscribers to be connected. When the system was first opened in January there were but 500 telephones connected.

The stockholders voted to increase the board of directors from nine to fifteen. The following directors were then elected: Henry Dumary, William H. Kelly, Howard Hendrickson, F. H. Sudro, I. H. Griswold, J. B. Rawson, T. M. Brush, W. E. Brooks and E. E. Williams. The new directors elected were E. B. Toedt, A. H. Heseberg, E. M. Woodard, G. C. Lee, Jr., August Huttnauder and James Moore.

Preparations are now being completed for the construction of new lines to Newburgh on the west side and Poughkeepsie on the east side of the Hudson River, taking in Castle, Coxsackie, Kingston, Catskill and other intervening points. Following the stockholders' meeting the directors organized by electing Howard Hendrickson, president; I. H. Griswold, vice-president; G. C. Loe, Jr., treasurer, and H. J. Prince, Jr., secretary.

MORE MONEY FOR KANSAS CITY.

ARRANGEMENTS are being made to greatly enlarge the scope of the Kansas City, Mo., Home Telephone Company, which is now being constructed. At least $400,000 more than was originally planned to be expended for the Kansas City plant will be spent.

The reason for this is the almost unanimous sentiment of Missouri citizens in favor of the Home Company. Everyone seems to want the Independent telephones. Whereas 6,500 subscribers was the utmost number planned for at the outset, the indications now are that the company will commence business with not less than 10,000. The company is buisly engaged in the construction of the new system, the conduit work being well under way. The new exchange building is being constructed and it is expected to have it completed by the first of September. By that time the switchboard will be completed and ready for installation, and it will not be long after that date that the company will open for business.

NEW YORK STATE FARMER ASSOCIATION MEETS.

THE quarterly meeting of the Orange and Sussex Counties Independent Telephone Companies' Association was held at the Fowler House, Port Jervis, N. Y., recently. The association comprises all the Independent telephone companies in Orange and Sussex counties. Among those present were the following: Orange County Telephone Company.—A. B. Wilbur, John McWilliams, Morris B. Wolf and President Charles Higham, all of Middletown. Chester Mutual Telephone Company.—President George M. Roe, Secretary E. T. Chamberlain, and Vice-President T. F. Lawrence, all of Chester. Warwick Valley Telephone Company.—President George H. Strong, Secretary George F. Ketcham, and Wm. H. Hynard and M. N. Kane. Farmers' Union Telephone Company.—President W. D. Hagerty. Highland Telephone Company.—President Henry Greenfield, Secretary C. H. Ayers, of Highland Mills, and George W. Conkling, of Monroe. Sussex County Telephone Company. Dr. J. N. Miller, of Newton.

A. V. D. Wallace and Mr. Drake, of Goshen, represented a proposed Independent telephone company for Goshen, and C. H. Ayres represented the Colonial Telephone Company, of Newburgh, besides the Highland Company.

The presidents or secretaries of the various Independent telephone companies submitted reports relative to the business done by their respective companies. All reported that the Independent movement is rapidly gaining strength.

There was a strong feeling at the meeting favoring the free interchange of messages among all the Independent companies concerned and not charge any toll. In some cases, however, this would be impossible, as, for instance, with the Highland Telephone Company, which operates over considerable territory that is sparsely populated.

In Orange and Sussex counties the Independent companies have proportionately more telephones than the Bell Company.

President Charles Higham, of the Orange County Telephone Company, of Middletown, reported that in Middletown, seven years ago, the Hudson River Company had less than 50 telephones, for each of which $48 per year was charged. He stated that the Independent Telephone Company now has over 600 telephones and has compelled the Hudson River (Bell) Company to reduce its rate to $2 and $2.50 per month. Almost the same rule applies with the two companies in Port Jervis.

The Editor's Page

A POSSIBLE OPPORTUNITY FOR AMERICAN APPARATUS

As is pretty well known, telephony is not in a most flourishing condition in France. The business has been a Government monopoly for about fifteen years, and the State department charged with the conduct of the service has not viewed its mission very seriously. There is little development and the service generally is a byword; the technical methods in vogue are archaic and of business methods—in the real meaning of the word—there are none, rather the contrary. So much agitation has arisen in France by reason of the inadequacy of the service, especially of the long-distance facilities, that the Department of Posts and Telegraphs has been spurred on to an endeavor to improve matters. The Minister of Commerce has deposited a projected law, prepared by M. Bérard, Under Secretary of State for Posts and Telegraphs, for the purpose of extending telephonic communications and of placing the general long-distance plant and that of certain of the local systems in a more satisfactory condition. M. Bérard proposes to ask the French Parliament to sanction the negotiation of a loan of $780,000, at 3 per cent., to be repaid by annual instalments from revenue, the whole loan to be repaid in a maximum period of five years.

It is stated in support of the bill that on January 1, 1903, there were in France 3,523 long-distance or toll circuits, representing a total length of 101,680 miles of wire. During the year 1902 no fewer than 1,317 circuits were erected, having a total length of 12,955 miles of wire. Evidently the average toll line in France must be very short, as the first set of figures gives an average length of just over 28 miles of wire per circuit, and the second an average length of circuit of under 10 miles. If the figures actually mean wire and the lines are metallic circuit, the actual average lengths of the circuits would be just half these figures. All these lines, except those used in international work, were established not at the expense of the State, but by means of advances made by the towns, counties, Chambers of Commerce and other public bodies and associations interested in the places connected. Those advances are repaid from the profits of the working. One of the principal reproaches directed at the French telephone system is the increasing difficulty of obtaining long-distance communication, the demand for the service far exceeding the capacity of the facilities provided. Moved by the complaints arising from this state of things, but being unable to add to the system sufficiently rapidly by means of his ordinary credits, M. Bérard invited the employees of the Administration to seek a means for obtaining a better output from the existing lines by freeing them of the service messages exchanged in building up the connections. The solution has been found by constituting a third circuit by means of two existing circuits. Three telephone lines are thus obtained, the regular metallic circuits being used in the ordinary manner and the phantom circuit for service instructions. M. Bérard thinks that the moment has arrived for the State to bring its direct and material assistance to the establishment of new telephone lines. He estimates that a sum of $1,200,000 is immediately necessary to carry out the most urgent work.

If the proposed line is put through there ought be be a good opportunity for the introduction of American telephone apparatus. It would be well in any event for our manufacturers and engineers to put themselves in touch with M. Bérard. This is an easy matter and may be accomplished by writing direct to the Under Secretary of State for Posts and Telegraphs at Paris.

The French experts are fully alive to the fact that we are well in advance of them in all matters pertaining to telephony, and they would undoubtedly welcome us in their field. They realize that new ideas in the art are to be looked for in the place where the telephone has made the greatest strides. With the Frenchmen the use of the telephone is still confined to a very limited number of people, and it is said there is not to be found in the whole of France a private house that has connection with the general system.

INTERESTING EXPERIMENTS WITH INDUCTION COILS

We desire to call special attention to the article appearing on the opposite page in this issue, and to commend it to the careful reading of every man who is interested in the technical side of telephony. It is one of the most interesting papers printed for a long time and deals with a subject that is of exceptional importance. It is unfortunate that there is not more work of this character to record in telephony. Somehow the old Bell shadow of secrecy seems still to be affecting the art so that such experimental laboratory work as is being done even by Independents is carefully screened from the public. Of course, everyone realizes that telephone manufacturers are not in business for fun or philanthropy, any more than any other class of men, and that commercial rivalry necessitates close laboratory methods. No house cares to make public the experiments of its engineers and thereby give the benefit of its work to its competitors. And as matters stand about the only experimental work of moment is being carried on by individual manufacturers. As the business broadens as it must, and methods and apparatus become more thoroughly standardized, the necessity for much of this secret work will pass away, and there will be a much more rapid advancement in the telephonic art, the sort of advancement that comes always with a free and open intercommunication between experts. In the meantime, we must continue to depend for much of our general laboratory work on the technical colleges, and it is to be hoped that they may all be as advanced in their methods as is the Iowa State College, in which the experiments recorded in this issue were made.

CATCHING THE FARMER.

One of the agricultural papers recently printed a glowing account of a "Successful Co-operative Telephone Company" which is operated in Westchester County, N. Y. The company was organized in December, 1900, by several farmers, and styled the Yorktown Telephone Company. The capital stock was $2,500. "Everything was left to the board of directors," the writer declares, "and after studying the matter well and having certain concessions made by the Bell companies, the committee decided to drop the original plan of working independently." The article then tells of the "easy terms" of the Bell Company with which the company became connected.

James M. Miller, of the Sussex Telephone Company, of Newton, N. J., in a letter to The American Telephone Journal in regard to this article, says:

"I do not know of the company mentioned in the article. It is a part of the organized scheme of the Bell Company as a last resort to harrass the Independent companies by catering to the 'farmer.' The proposition is a smooth one to collect $5 royalty, let the farmer build and maintain the lines and operate them through the Bell switchboard. The Bell charges tolls for all connections through its switchboard. As in the instance named in the article, the subscriber pays $4.50 per quarter for the privilege of talking to 44 other subscribers. Any Independent company would be glad to give service on such terms. In addition to the rental, however, the subscriber pays $2.50 in tolls and probably has economized his service to the greatest possible extent to keep the sum within this figure. I venture to say that there is not an Independent company in existence which is not doing better by its patrons. For $24 per year the Sussex Telephone Company is giving its patrons connection with 1,800 telephones without any extra toll charge. Comparing the two, our Westchester County friends are very easily satisfied. But really the article is but another emanation from the Bell press bureau, which is active in all directions, and as I say is an organized plan to fool a class of people who do not look into things as closely as most people do. The same offers and better are being made here and have been for the past six months on the part of the Bell, but our subscribers are perfectly satisfied with the service of the Sussex Telephone Company, and would not connect with the Bell under any circumstances."

THE RELATION BETWEEN THE DIMENSIONS OF AN INDUCTION COIL AND ITS EFFICIENCY IN TRANSMITTING SPEECH

The experiments described below were carried out in the Electrical Engineering laboratories of the Iowa State College, by Messrs. M. P. Cleghorn and E. R. Nowlan, senior students in Electrical Engineering, as a thesis study. The object of the study was to determine whether or no any definite relation exists between the dimensions of the coil (that is, length of core, diameter of coil and ratio of primary to secondary turns) and the efficiency with which it transmits speech; that is to say, the faithfulness with which sound is reproduced by it, having in mind the distinctness and the volume of the sound at the receiver as compared with the same qualities in the sounds spoken to the transmitter.

TWENTY-THREE coils were tested. Four of these coils were made in prominent telephone factories. The remaining nineteen were made up expressly for the test. Some of these made-up coils were designed according to data furnished by well known telephone manufacturers. The general construction of the made-up coils was as follows: A cylinder, made by gluing together several layers of paper, was provided with walnut heads, which were glued to the paper. Two coils of wire were wound on each of these paper cylinders, the inner coil, called the primary in these discussions, being in every case of a smaller number of turns than the secondary. The two coils were separated by two thicknesses of rice paper, and every care was used throughout the construction work to get the coils up in first-class condition. In the test the connection of apparatus was that shown in Fig, 1. A number of the coils which were being tested were placed side by side upon a convenient table, as indicated in the figure. A double-pole double-throw switch was so arranged that, turned in one direction, the standard coil was placed in circuit, and when turned in the opposite direction the movable connectors *SS* and *PP* were placed in communication with the line. These connectors, under this arrangement, could be placed in turn on the terminals of each of the coils under test, bringing them successively into use.

	Primary.				Secondary.									
Coil No.	Turns	Size Wire	Res. in Ohms	Ind.	Turns	Size Wire	Res.	Ind.	Ratio Trans.	Diam Core.	Length of Core.	Core Wire	Heads	Spool tubes
*1	111	22	392	.0061	5139	32	157	1.264	46.3	1/2"	4"	*18	1/4"	Paper
2	44	22	.14	.0012	2246	32	70.7	.218	51.5	1/2"	2"	18	5/16"	"
3	198	22	.62	.0021	2164	32	87.9	.0315	10.9	1/2"	2"	18	1/4"	"
4	80	22	.274	.0034	2413	32	76.3	.29	30.16	1/2"	3"	18	1/4"	"
5	44	22	.099	.0012	2688	32	79.	.268	61	3/8"	2"	18	1/4"	"
7	132	22	.364	.00086	2354	32	82.25	.208	17.8	3/8"	2"	18	1/4"	"
8	124	22	.24	.00074	1240	32	43.	.079	10	1/2"	3"	20	1/4"	"
9	2640	32	73.5	.365	4000	30	134.3	.854	1.5	1/2"	4"	18	5/16"	"
10	208	22	.54	.00225	1400	36+32 ≅	34.8	.739	6.73	1/2"	4"	18	5/16"	"
11	400	26	2.08	.00574	1506	28	13.4	.0812	3.76	3/8"	4"	18	1/4"	"
12	228	22	.52	.00174	900	36	58.4	0345	4	3/8"	4"	18	1/4"	"
13	400	26	2.07	.00497	1241	28	16.3	.0475	3.1	3/8"	4"	20	5/16"	"
14	220	22	.481	.0025	5500	36	420	1.124	25	3/8"	4"	20	1/4"	"
15	262	18	.29	.003	420	22	1.91	.0079	1.6	1/2"	4"	20	5/16"	"
16	400	26	2.07	.00525	1700	28	21.	.0962	4.25	3/8"	4"	18	1/4"	"
17	1409	22	25.8	.04	1800	26	13.36	.0895	1.27	3/8"	6 1/2"	20	1/4"	"
18	113	22	.393	.0006	554	22	1.71	.014	5	1/2"	4"	18	5/16"	"
19	371	28	3.5	.0054	2503	32	74.	.208	6.7	3/8"	2"	18	1/4"	"
20	170	22	.56	.0011	2800	26	26	.399	16	1/4"	2 1/2"	20	1/2	"
*21	270	20	.35	.0015	2139	32	32	.0978	7.8	1/4"	3 1/2	23	3/8"	"
5G	275	18	.88	.0021	2934	30	84	278	10.7	3/8"	3 1/2"	23	3/8"	"
5H.	275	18	.88	.0022	3910	30	217	463	14.2	3/8"	3 1/2"	23	3/8"	"
* Standard														

DIMENSIONS OF COILS.

Two similar stations were established in different rooms on the same floor of the physical laboratory. Each station was equipped with a transmitter, receiver, battery, induction coil, board, standard induction coil, switch, etc.

The transmitters and receivers used in the test were the standard instruments of the Kellogg Switchboard & Supply Co., and in the test were arranged in fixed positions. Two 80-ampere-hour Gould storage cells were used as the source of current. They were arranged as shown in the figure. The voltage on the line was changed by moving the sliding contact as indicated.

The standard coil referred to in the above description was coil No. 21, and the behavior of each coil was compared with that of this coil arbitrarily chosen as a standard for the experiments.

The two stations were connected in such a manner that different lengths of line could be placed between them. One was connected to a party line of eight Stromberg-Carlson divided-circuit, central-checking telephones, which were partially selective, four of them having their ringers bridged between one wire and ground, while the other four were between a second wire and the ground. By disconnecting the ground wires of each instrument, the line was cleared. This line terminated at the Boone County Telephone Company's exchange at Ames, Ia.

The other station was connected to the college inter-communicating system of twenty-three telephones of the Stromberg-Carlson bridging type. This system was connected to a circuit that terminated in the Ames exchange. By throwing two switches and disconnecting an extension bell, this line was also clear.

These two lines were simply connected together for test No. 1 by a regular cord circuit of the Stromberg-Carlson type, consisting of a 400-ohm supervisory drop in series with one side of cord and shunted by a 2-Mf. condenser. This completed an all-metallic circuit six miles in length of No. 14 B. & S. BB galvanized iron wire, having a resistance of 57.44 ohms per wire per mile. No ringing apparatus was bridged across the line at either station, central being called and instructions given her over a separate line.

For test No. 2 the two lines just described were used, but instead of being connected together as before, one was connected by a regular cord circuit to a line from Ames to Boone. The line was extended at the exchange in Boone by another cord to a line from Boone to Des Moines. At the Des Moines Mutual exchange this line was connected to a line from Des Moines to the exchange at Ames, where it was connected to the other of the two short lines and thence to the other station.

The long distance line was exactly 100 miles of No. 9 BB galvanized iron wire, having a resistance of 18.06 ohms per mile per wire. The line from Ames to Boone was 14 miles long, with one bridged station between; Boone to Des Moines, 45 miles, with no station between; Des Moines to Ames, 41 miles, with five bridging stations between. The cord circuits at Boone consisted of a 500-ohm bridging supervisory drop, while at Des Moines a 1,200-ohm bridging supervisory drop was used. All connections possible in local circuit were soldered.

The tests made were essentially those outlined in *Miller's American Telephone Practice,* modified to suit conditions. In the tests it was supposed that the efficiency of an induction coil was made up of but two factors—volume and clearness.

Date- May 7, 1902				Length of Line 6 miles.				
Coil	Hour	V	C	$\%_V$	$\%_C$	$\%_A$	$\%_{CS}$	$\%_{AS}$
1	P.M. 10:40	2.83	.155	62 5	72	67.25	97.50	77.5
2	10:53	2.8	.172	47.5	67	5725	91 00	65.7
3	11:03	2.83	.159	100.	81	90.50	109 5	104.
4	11:14	2.8	.157	27.5	67	47.25	91.00	54.5
5	11:28	2.85	.158	40	72	56.00	97.50	64.5
7	11:40	2.8	.165	90.	77	83.50	104.	96.
8	11:50	2 9	.163	90.	81	85.50	109.5	98.5
9	M. 12	.95	.040	35.	64	49.50	86.5	57.
10	A.M. 12:20	3.	.113	100	85	92.50	115.	103.2
11	12:37	2 85	.105	100.	75	87.50	101.5	100.5
12	12:51	3	.105	80.	85	82.50	115.	95.
13	1:38	2.95	.100	105.	73	89.00	98.7	102
14	1:46	2.97	.120	87.5	68	77.75	92	88.5
15	2.00	297	.107	82.5	79	81.75	107	92.5
16	2:09	2.85	.105	110.	76	93.00	102.5	107
17	2:20	1.7	.160	85.	67	76 00	91	87.5
18	2:30	3.	.113	45.	62	53.50	83.6	61.5
19	2:42	2.75	.103	100.	77	88.50	104	101.5
20	2:52	3.	.108	32.5	63	47.75	84.3	54.9
21	12:12	3 1	.110	100	74	87.00	100.	100
5G	3:00	3.	.110	100	75	87.50	101.3	100.5
5H	3:10	3.	.112	102	67	84 75	91.	97.6

TEST NO. 1.

The volume, sometimes called intensity, was determined relatively only, i. e., in terms of the volume of the standard coil. In describing the tests the two operators, or those who are making the tests, will be designated by A and B. In testing for volume, A says to B "Volume on No. 1," and both throw their switches so that the standard coil is in circuit. A then counts "1-2-3-4-5 on No. 1 and 1-2-3-4-5 on No. 2." At the word "and," A and B throw their switches simultaneously to connect in the coil to be compared. A repeats this operation two or three times, and B then records his judgment of the relative volumes in per cent. without informing A. B then repeats the process and A judges the volume and records it. An average of the two percentages is then found, which represents very closely the comparative volumes.

The clearness test was that outlined in *American Telephone Practice,* modified somewhat to obviate as nearly as possible any prejudice or error. Eight lists of 50 words each were prepared, similar to the following:

1	2	3	4	5	6	7	8
brought	thot	wrot	fought	bought	fraught	caught	ought
new	Jew	brew	blue	rue	true	you	due
E	D	G	P	B	C	V	fee
28	48	8	38	88	888	68	58

In this way eight lists were obtained, each of which contained a word similar in sound to words in each of the other lists. Operator A used four of the lists and B the other four. After the lists were prepared in this way, each word was written on a small card and each bunch of cards representing a list were placed in a box. Blank forms were used, upon which was written all data. In the test both operators connect the coil to be tested by means of the clips and switch. Then A proceeds to draw cards from a box, one at a time, to read the word written on it into the transmitter and to record it on the "Sent" side of his log sheet. B records on the "Received" side of his log sheet what he hears. When the list of fifty words are given in this way, B repeats the process with another list, A recording what he hears. The original list and the received list are then compared in each case and the percentage of correct words found. The average

Date = May 26-27, 1902				Length Line 106 mi.					Av. $\%_{AS}$ of both Tests.
Coil	Hour	V	C	$\%_V$	$\%_C$	$\%_A$	$\%_{CS}$	$\%_{AS}$	
1	P.M. 10:50	3	.140	163	86	124.5	106	136	106.7
2	11:03	3	.135	77	59	68	73	75	70.35
3	11:15	2.8	.155	110	80	95	99	105	104.5
4	11:26	2.95	.130	95	81	88	100	97.5	76.
5	11:37	3	.115	30	28	29	34.6	32	48.25
7	11:50	2.9	.120	105	80	92.5	99	102	99
8	A.M. 12:03	2.95	.118	92.5	88	90.2	109	99.8	99.15
9	12:15	1.05	.040	50	40	45	49.5	49.7	53.37
10	12:26	2.95	.120	102.5	84	94	104	104	103.6
11	12:36	2.85	.125	72.5	79	75.8	97.5	84	92.25
12	12:47	3	.122	65	79	72.	97.5	79.6	87.3
13	1:00	2.85	.115	82.5	81	81.7	100	90.5	96.25
14	1:10	3.	.120	105	80	92.5	99	102.5	95.5
15	1:45	3.	.127	73	75	74	92.7	82	87.2
16	1:57	2.8	.125	105	66	85.5	81.5	94	100.5
17	2:10	1.5	.070	48	49	48.5	60.5	53.7	70.6
18	2:22	3.05	.115	48	67	57.5	82.8	63.6	62.5
19	2:35	2.85	.095	105	84	94.5	104	104.5	102.7
20	2:45	3.05	.085	63	62	62.5	85	69	62
21	3:10	3.2	.110	100	81	90.5	100	100	100
5G	2:53	3.05	.110	107	69	88	86	97.5	99
5H	3:00	3.05	.110	115	77	96	95	106	101.8

TEST NO. 2.

of these two percentages is then determined, thus obtaining a figure nearly independent of any slight defect of hearing or speech of either operator, or any error at either end.

The connections of the primary circuit were adjusted to give, with the standard coil, in circuit, as nearly as possible a reading of three volts at the terminals of the transmitter and a current of about one-tenth ampere in primary circuit, these values being found to give the best results. These readings were taken after the transmitter had been struck a sharp blow with the hand, this being done to destroy any packing and also to insure a uniformity of distribution of the carbon.

The words used in the clearness test were found quite difficult to distinguish in some cases, since there was no context. It was feared that the words might be remembered and thus introduce errors, but it was found that by changing the lists used for each coil and shaking up each list before using again, no appreciable error resulted.

In the volume tests, as well as the clearance tests, as even a tone of voice was used as possible.

By the aid of a third person, who made connections and read instruments, a complete test of one coil could be made in about nine minutes.

The tests were made between 10:30 p. m. and about 4 a. m., this being the only time that the line was not busy. Some slight disturbances existed in all tests, caused by cross talk and alternating current machinery. This was so slight, however, and so uniform throughout the test that no great difficulty resulted from it.

The tests were made on quiet, clear nights, when uniformity of weather conditions during the test were sure. Each test was finished in one night.

The data sheets herewith affixed give all the data as to the dimensions of the coils and the results obtained from the two tests. On the sheets containing results of the tests the following symbols are used: V represents the voltage around transmitter terminals; C the current in amperes flowing; $\% V$ the per cent. of the volume compared with the volume of the standard coils; $\% C$ the per cent. of clearness, or the per cent. of words received correctly; $\% A$ the average of $\% C$ and $\% V$; $\% AS$ the per cent. of efficiency of $\% A$ as compared with standard; $\% CS$ the per cent. of clearness as compared with standard. The last column under test No. 2 is the average of per cent. efficiences of the two tests.

The data sheets contain some very interesting results. There is, however, apparently no relation between the ratio of the number of turns on primary and secondary coils, or the linear dimensions of the coil, and the efficiency of speech transmission when the coil is connected as in the above experiment. It should be mentioned that the data given is for two single complete tests. It seemed desirable that a number of tests be made and that the averages of these several tests be taken. Several other tests were attempted at difficult times, but failed because of bad weather or other unforeseen differences in the way of the operation of the lines and apparatus.

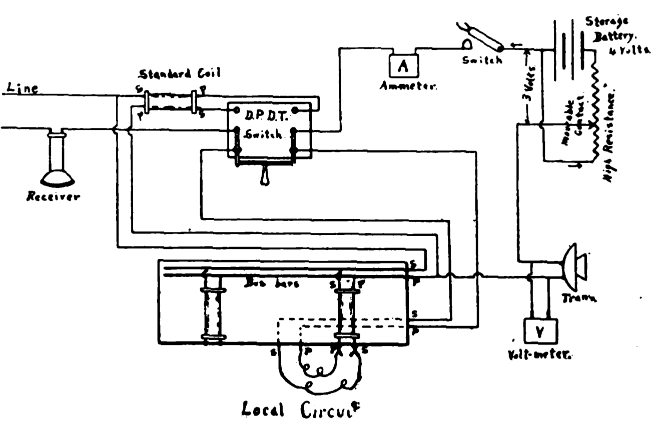


FIG. 1.

DOES THE PUBLIC TELEPHONE TRANSMIT DISEASE?*

By William G. Bissell, M. D., Buffalo, N. Y., Bacteriologist, Department of Health.

VARIOUS manufacturers have, from time to time, turned out devices to be attached to the transmitters of public telephones, claiming that their use minimizes the possible transmission of diseases from this source. The question often has been asked, "Does the public telephone transmit disease?"

In order to discuss this question, two important points must be considered:

First, is the human body, and particularly the mouth of well persons, a possible carrier of infection?

Second, if so, what part does the telephone play in transferring such infection?

The popular conception that a disease germ enters the body, produces its disease, and passes out again without receiving a great amount of resistance, is not confirmed by scientific investigation and experiment.

If the germ has the greater power, the disease is the result, but if the vital forces are in excess, the organism, although it may have gained entrance, does not cause disease. The same is true of the final exit and the destruction of the germ after the recovery from disease; and this leads to the inference, proven in a variety of conditions, that persons, to all appearances physically well, may become carriers of germs. Experimental evidence has shown that many germs carried under these conditions are capable of infecting animals, and there is no basis for belief that germs carried in this way are none other than harmful.

It is probable that the microbe of influenza vegetates on the mucous membranes for a period of time after recovery from that disease. It has been known, for more than twenty years, that the germ of croupous pneumonia flourishes in the mouth of every healthy person. If we consider these facts, and remember that the diphtheria bacillus may, and very frequently does, persist in the throat and nose of persons who have come in contact with diphtheria, and yet are clinically well, it makes one believe that, by the use of the telephone, on account of the close proximity of the mouth, it is possible for infection of various kinds to be deposited upon the transmitter and that persons, during inhalation while using the instrument, might become infected.

In order to positively ascertain if such conclusion was correct, during the early part of the present year, experiments were inaugurated along the following line: Statistics show that the diphtheria bacillus is contained in the throat of about one person in each one hundred. If this be true, and there is no reason to doubt the accuracy of the statement, it is fair to suppose that telephones situated in such localities as the Hotel Iroquois, the Genesee Pharmacy, the Tifft House and the Genesee Hotel, (in Buffalo) would, during a period of constant use, become infected with this organism.

The telephones in these localities are used by many hundreds of persons during each day, and in view of this fact, cultural examinations were made as follows:

Twenty-five cultures were taken, using sterilized swabs, the same being rubbed around the entire inner surface of the transmitters. At the Hotel Iroquois, such investigation covered a period of four different days; at the Tifft House, three different days; at the Genesee Pharmacy, two different days; and at the Genesee Hotel, one day. It is fair to assume that, if the diphtheria bacillus was contained in the transmitters, a procedure of this character would demonstrate its presence. After most persistent search, it was impossible to demonstrate the presence of this organism.

It must be remembered, however, that the telephones in the locations mentioned are kept in a cleanly manner, the transmitters being frequently wiped by the use of a dampened cloth. In view of these circumstances it is fair to assume that by the use of telephones which are kept ordinarily free from dust, there is little danger of the transmission of disease.

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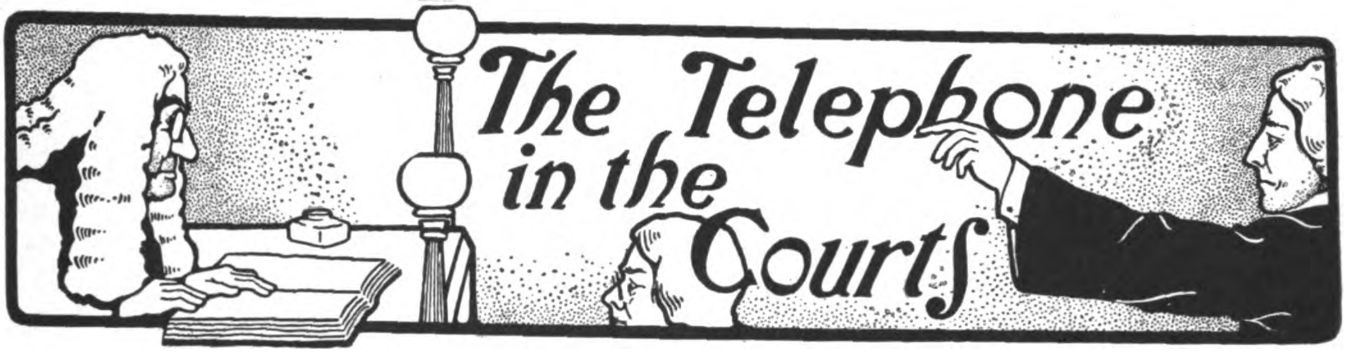
*A paper read before the Medical Union at Buffalo, N. Y.



The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

A TWENTY-YEAR-OLD CASE ARGUED.

ARGUMENT was begun on the first of May, 1903, in the United States Circuit Court of Appeals sitting in Boston, Mass., before Judges Putnam, Aldrich and Brown in a suit begun twenty years ago by the Western Union Telegraph Company, the American Speaking Telephone Company, the Gold & Stock Telegraph Company and the Harmonic Telegraph Company against the American Bell Telephone Company. Action was brought to recover about $7,000,000 which the plaintiffs claim to be due them upon an accounting under a contract made by them with the National Bell Telephone Company, the predecessor of the American Bell Company, on November 10, 1879. In that instrument the National Bell Company agreed to pay the Western Union and the other plaintiffs twenty per cent. of all rentals or royalties received from licenses from telephones in the United States. The defendant issued licenses to certain corporations and, in addition to the annual rentals for telephones, received thirty-five per cent. of the capital stock of these corporations. Plaintiffs claim this stock amounted to "rentals and royalties" within the meaning of the contract, and that it is entitled to twenty per cent. of the stock in question together with the dividends declared thereon. On the other hand, the defendant contends that "rentals and royalties" in the contract in question are the annual rentals and nothing more. The case was referred to a master in chancery, who decided in favor of the defendant. The circuit court confirmed the report of the master and dismissed the bill of complaint of the plaintiffs. From that decree the plaintiffs appeal.

The importance of the case has caused the employment of famous counsel on both sides. Rush Taggart and J. H. Benton, Jr., represented the plaintiffs; Richard Olney, J. C. Gray and C. H. Swan the defendant. No decision has yet been made.

MICHIGAN SUPREME COURT DECISION AVOIDED.

THE Michigan Telephone Company claims to have won a victory that practically annuls the decision of the Michigan Supreme Court holding it bound to furnish service to all the subscribers of the Detroit Telephone Company, which was absorbed by the Michigan Company in 1900. The victory it claims lies in a decision of the United States Circuit Court sitting at Detroit. The Old Colony Trust Company, which has a mortgage on the Michigan Telephone Company to secure $4,000,000 worth of bonds, was suing to foreclose the mortgage and had caused a receiver to be appointed for that company. The Central Trust Company, of New York, held a mortgage on the Detroit Telephone Company. It claimed that by the consolidation of the Michigan and Detroit companies the property of the two companies had become so identified that it was impossible to proceed against the Detroit Company alone. It therefore asked to be allowed to intervene in the foreclosure suit of the Old Colony Trust Company. The contention of the Old Colony Company was that it knew nothing of the purchase of the Detroit Company and it claimed the right to wind up the affairs of the Michigan Company free from the burden of the Detroit Company's franchise.

The court sustained the Old Colony Trust Company's contention and denied the petition to intervene upon the part of the Central Trust Company. The Old Colony Company can now go on with its foreclosure proceedings without regard to the fact that the Michigan Company has acquired the Detroit Telephone Company, and can treat the Michigan Company as an entirely separate company, leaving the Central Trust Company to do the same with respect to whatever there is left of the Detroit Company. The advantage the Michigan Company sees in this is that it can refuse to furnish telephones at the rates charged by the old Detroit Company and that its affairs can be wound up and a new company organized that will be free from the burdensome obligations of the Detroit Company.

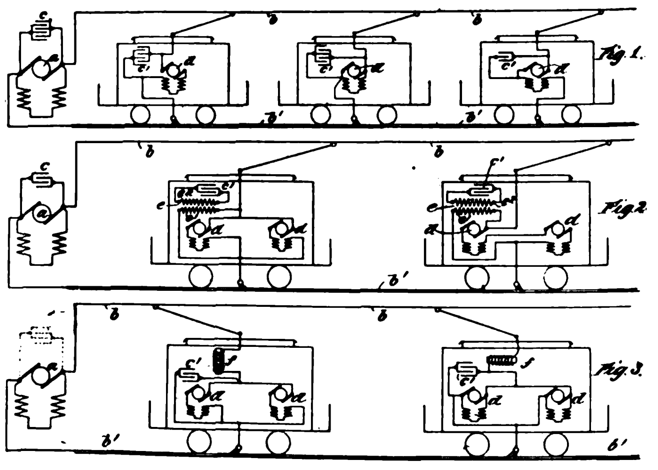
IMPORTANT TAX DECISION IN MARYLAND.

THE commissioners of the town of Cambridge, Md., sued the telephone and telegraph companies operating therein for taxes upon their poles within the town limits. The ordinance upon which the suit was founded was copied from the Baltimore ordinance upon the same subject. The court held that the Baltimore ordinance was passed in pursuance of powers specifically delegated from the state legislature which had not been granted to the town of Cambridge. It therefore dismissed the declaration and refused to hear arguments from the counsel for the town. The case will be carried to the Court of Appeals, and if sustained, will put an end to all municipal taxation of this character by Maryland towns.

Patents

MEANS FOR PERFECTING THE INDUCTIVE DISTURBANCE OF TELEPHONE CIRCUITS.

Carl Joseph August Michalke, Charlottenburg, Germany, patents (No. 726,963) and assigns to The Siemens & Halske Electric Co. a method for obviating inductive disturbance on telephone lines, such as would be produced by electric railways. This patent is illustrated in Figs. 1, 2 and 3. It is well known that inductive disturbances in telephone lines are caused by sudden variations in the current strength of neighboring circuits. It is



also known that by the addition of sufficient capacity and inductance to an electric circuit these sudden variations may be largely if not entirely eliminated. As is shown in diagram in Figs. 1 and 3 inclusive, the inventor proposes to equip the dynamo of the power station, as shown at *c*, and those of the car motors, as shown at c^1, with the condensers and impedance coils, and by this means to neutralize the inductive disturbances.

TRANSMITTER.

Friedrich Wilhelm Senkbeil, of Offenbach-on-the-Main, Germany, patents (No. 726,360) a telephone transmitter. This is a patent for an improved transmitter particularly adapted to loud talking. It is shown in Figs. 5 and 6.

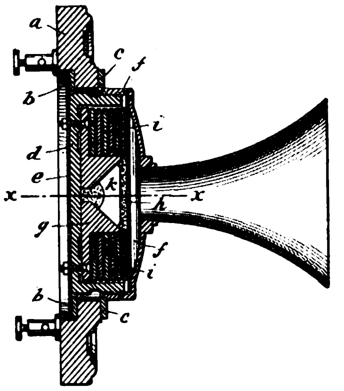


FIG. 4.

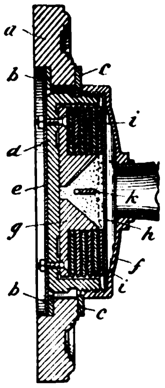


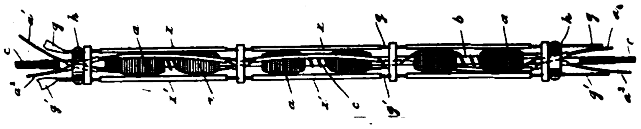
FIG. 5.

The improvement consists in a peculiarly shaped carbon holder *g* in which the granular carbon is placed, and a rod or guide *k* inserted in the space occupied by the carbon. The combination of the receptacle and the rod the inventor claims produces a circulation of carbon granules and consequently obviates packing.

ELECTRIC CABLE.

Francis Tremain, Highgate, England, patents (No. 727,031) an improved form of electric cable. This invention is shown in Figs. 6 and 7. It consists in an improved design for impedance coils to be placed in telephone cables, after the plan of the Pupin balancing coils in order to neutralize cable capacity. The coils as shown in Figs. 6 and 7 are wound as a series of discs in sectional form, each section being about 3-16 inch thick and 7-16 inch in diameter. The core is about 1-16th of an inch in diameter. The coils are then interspersed in the cable and the cable conductors formed around them, as shown in Figs. 6 and 7.

FIG. 6.



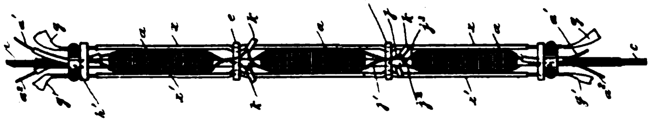


FIG. 7.

SELECTIVE DISTRIBUTING SYSTEM.

John Stone, Cambridge, Mass., patents (Nos. 726,476 and 726,368) and assigns to the American Bell Telephone Company, a method for selective signals. This patent is shown in Fig. 8. It is well known that any electrical circuit may, by means of suitably adjusting its inductance and capacity, be arranged to respond to one particular set of electrical waves irrespective to all others. As is shown in Fig. 8, Mr. Stone provides each sub-station with a different amount of capacity and inductance, and thus provides signaling current of various frequencies or such a current as may be resolved into waves of different frequencies. As each sub-station is attuned to one particular frequency its signal will only respond when that frequency is transmitted over the line and as a result a selective system is provided. This patent is divided and a second application filed under 726,476. Patent 726,368 claims the method of producing and impressing current impulses of a harmonically vibratory character. No. 726,476 claims a resonant circuit that is attuned to be sensitive to different rates of vibration.

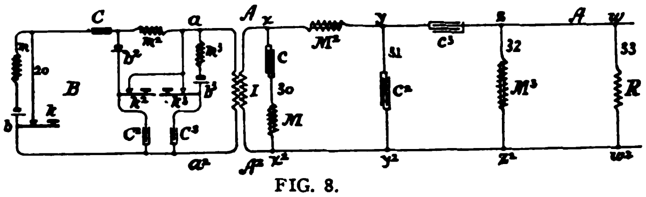
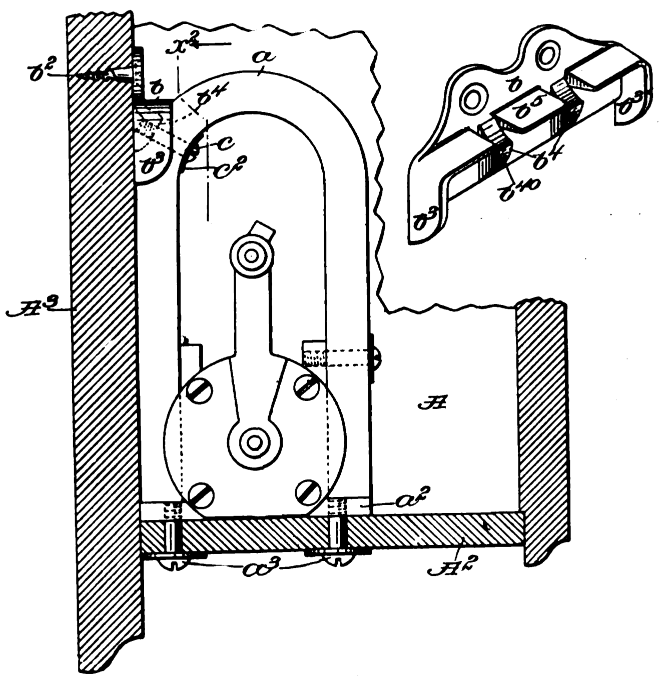


FIG. 8.

IMPROVED MAGNETO GENERATOR.

Charles W. Holtzer, Brookline, Mass., patents (No. 726,687) an improved magneto generator. This patent is illustrated in Figs. 9 and 10. The object of this invention is to provide a support for the magnets of the magneto generator in such a manner that they may be attached without liability to tear loose from the fastenings that secure them to the surrounding box. In Fig. 9 the inventor provides a peculiarly shaped bracket b^3 that is shown in perspective view in Fig 10. This bracket is arranged to clasp the magnets of the magneto generator near the top and thus provide an additional support which firmly secures the magnets in the enclosing box.



FIGS. 9 and 10.

THE PAUL TELEPHONE CIRCUIT.

Editor American Telephone Journal:

In your issue of April 25 I notice an article on my telephone system, patent for which was issued on April 14. As it contains one or two inaccuracies I feel that you will be pleased to have them corrected. You state Fig. 1 shows a sub-station connected to central office, whereas it is Fig. 2 which shows this, the sub-station on the left and the central on the right. Fig. 1 really shows one of my claims, viz., central operator talking to sub-station on the left through bell of sub-station on the right. Again, you state that all of the wires L^1 of the entire telephone system are tied together, whereas it should be of each section only of, say, 1,000 subscribers each in a large central.

Lastly, you state when the subscriber wishes to call the office he rings in the usual manner, the ringing current passing over the common return *G*. Now, this is altogether misleading. The system as regards ringing up central is altogether automatic, and this is accomplished on the subscriber's auto. hook being relieved. This act has either closed the central battery *V* through indicator *I* or then the operator and subscriber are immediately in communication with one another, depending upon the position of central automatic key whether it is in its normal or abnormal position. No plugs whatever are required to accomplish this.

THOMAS PAUL.

The Week's Messages.

FINANCIAL

CHICAGO, ILL.—The name of the Vive Manufacturing Company, Chicago, has been changed to Kortsrom Lock Out Telephone and Manufacturing Company; the capital stock has been increased from $2,500 to $6,000.

SHARPSBURG, KY.—The stockholders of the Sharpsburg Home Telephone Company have voted to increase the capital stock from $3,500 to $8,000. The following board of directors has been elected: M. V. Bostain, W. R. Knight, B. T. Wright, W. H. Pieratt, R. L. Sharp and R. L. Berry. The board of directors elected the following officers: B. T. Wright, president; W. H. Pieratt, vice-president, and W. R. Knight, secretary-treasurer. The number of directors was reduced from twelve to six.

FLUSHING, OHIO.—The Flushing Telephone Company has increased its capital stock from $10,000 to $25,000.

NORTH BALTIMORE, OHIO.—Quite a large block of the stock of the North Baltimore Home Telephone Company has been disposed of to Bellevue capitalists. The purchasers are identified with their local company and also with the Galion Company. Fifty new telephones have just been ordered and a new line is being built to Van Buren.

MEADVILLE, PA.—The Meadville Telephone Company has increased its capital stock from $30,000 to $60,000.

SUMTER, S. C.—The Sumter Telephone Company has applied to the Secretary of State for amendments to its charter permitting increase in capital stock.

SHERMAN, TEXAS.—The Grayson Telephone Company of Sherman has filed an amendment to its charter increasing its capital stock from $170,000 to $340,000.

FORT ATKINSON, WIS.—The Jefferson County Telephone Company of Fort Atkinson has increased its capital from $8,000 to $15,000.

FRANCHISES

PASADENA, CAL.—The city council has granted a franchise to the Home Telephone Company. But one bid was offered, $101, by F. F. Graves, for the Home Company.

JULESBURG, COLO.—A representative of the Wyoming Telephone Company was in Julesburg recently and interviewed the Mayor and board of trustees in reference to a franchise for a telephone line in this town. An application for a franchise will be presented to the board at its next regular meeting.

FREEPORT, ILL.—The Stephenson County Telephone Company has been given a franchise by the Board of Supervisors in Stephenson County and will enter into competition with the Central Union Company. The franchise gives admission to Freeport for all Independent lines by connection with the system at Rockford.

McCOMB, ILL.—The City Council has granted a new franchise to the Illinois Western Telephone Company and one also to the McDonough County Farmers' Telephone Company.

CLINTON, IND.—An ordinance has been introduced into the City Council granting a telephone franchise for twenty years to Willis H. Clinton and Abraham F. Long, of Paris, Ill. The franchise fixes the maximum charge for telephone rent at $15 per year. It provides also that a per cent. of the gross income shall be paid into the City Council.

ONAWAY, MICH.—Manager Clark, of the Onaway Telephone Company, asked for a franchise here recently, which was unanimously granted. The company has heretofore been operating solely under the State law.

SAULTE STE. MARIE, MICH.—Application has been made to the City Council for a franchise to establish an Independent telephone system in the city. There is considerable indignation against the Michigan Telephone Company, which has recently raised its rates, and indications are that the new venture will meet with good support from the start.

INDEPENDENCE, MO.—At the meeting of the common council, the Warrensburg Telephone Company asked for a franchise, the inducements it offered being to furnish a free service between Independence and Kansas City, provide eight telephones free to the city departments and deposit a bond in the sum of $1,000 that work on the system would be commenced within ninety days. A company from Pleasant Hill also asked for a franchise, with no concessions offered. Both propositions were referred to a committee.

GRAND FORKS, N. D.—At a meeting of the City Council, C. C. Gowran was granted a telephone franchise in this city. Mr. Gowran represents the Twin City Telephone Company. The Northwestern Company has been fighting the granting of the franchise tooth and nail. The Twin City Company will at once start work on the construction of a $10,000 plant.

ELIZABETH, N. J.—The People's Co-operative Telephone Company of New Jersey has asked for a franchise from the city of Elizabeth by its counsel, John K. English.

NEW BRUNSWICK, N. J.—The Common Council has passed the ordinance giving a franchise to the Central New Jersey Telephone Company over the Mayor's veto by a vote of 7 to 5.

LONSDALE, R. I.—A petition was received recently by the Council from Herbert Harris to establish a telephone line.

ELECTIONS

BRIGHTON, ILL.—At a meeting of the Mutual Telephone Company the following officers were elected for the ensuing year: President, Philip Lauck; vice-president, Dr. T. A. Horine; secretary, I. M. Clark.

MONMOUTH, ILL.—The Olive Telephone Company held a meeting recently and elected the following officers: President, J. H. Gayman; secretary, Mrs. J. E. Amos, and treasurer, C. C. Ray.

WOLF CREEK, MICH.—At a meeting of the Farmers' Telephone Company, of Wolf Creek, the fellowing were elected directors: Joseph Driscoll, C. E. Marshal, John Driscoll, George Hallett, E. G. Montgomery, Chas. Selleck, L. W. Baker, B. J. Cole, Seward Mapes. The officers elected are: E. G. Montgomery, president; Chas. Selleck, vice-president; L. W. Baker, secretary; C. E. Marshal, treasurer; George Hallett, manager.

PAVILION, N. Y.—At a meeting of the Oatka Telephone Company the following officers were elected: J. C. Doty, president; Fred. Chilson, vice-president; J. H. Powers, secretary; George J. Carr, treasurer; J. C. Doty, A. E. Wellman, J. H. Powers, Fred. Chuson and C. J. Taylor, directors.

WARWICK, N. Y.—At the annual meeting of the Warwick Valley Telephone Company announcement was made that the company would pay a semi-annual dividend on July 1 of 2½ per cent. The old board of directors were re-elected as follows: G. H. Strong, M. N. Kane, W. C. Lazear, W. E. Baily, F. M. Cummins, W. A. Hynard, S. H. Sanford, F. C. Cary, G. F. Ketchum.

TOWANDA, PA.—The stockholders of the Bradford County Telephone Company have voted to increase the number of its directors from 9 to 12. The board is now composed of Chas. L. Tracy, Henry C. Porter, Geo. T. Ingham, William Maxwell, U. M. Fell, E. B. McKee, S. C. Thayer, M. E. Horton and W. G. Tracy, of Towanda; Edward Davis and Robert M. Dougal, of Philadelphia and Colonel C. M. Clement, of Sunbury. The three gentlemen last named are vice-president, secretary-treasurer and general solicitor respectively of the York State Telephone Company, now operating the Independent telephone systems in Elmira and Binghamton, N. Y.

FAIRFAX, S. D.—At a meeting of the stockholders in the company recently organized here for the purpose of constructing a telephone line between this place and Echo and Scalp creek, the following were elected directors: Z. K. Doane, C. F. Pierce, E. Scheinost, E. L. Dufur and Peter Hansen. The directors elected Z. K. Doane president and C. F. Pierce secretary of the company.

PLANKTON, S. D.—At a meeting of the directors of the local telephone company which was recently organized here, the following officers were elected: President, N. H. Berens; vice-president, A. C. Lyons; secretary, O. P. Auld; treasurer, H. V. Sears.

STAUNTON, VA.—The Augusta County Telephone Association, of Staunton, has elected the following officers: John W. Todd, president; Dr.

THE WEEK'S MESSAGES—Continued.

C. M. Hildebrand, first vice-president; Hon. John W. Churchman, second vice-president; J. M. Baylor, treasurer; John S. Richey, secretary; directors, A. H. McCue, John W. Montgomery, J. F. Clemmer, W. F. Koiner, J. M. Randolph and E. J. Wayland.

COMBINATIONS.

PLAINFIELD, IND.—The Plainfield and Danville telephone companies have consolidated under the charter of the Plainfield Company and will be known as the Consolidated Telephone Company. The directors are Dr. Amos Carter, Plainfield; B. W. Anderson, Plainfield; J. M. Griest, New Haven, Conn. The directors organized by electing Dr. Amos Carter, president; J. M. Griest, vice-president; B. W. Anderson, treasurer; J. J. Brown, secretary, and B. W. Anderson, general manager.

JEWELL, IA.—The Jewell Telephone Company has purchased the toll line of the Martin Telephone Company between Jewell and Radcliffe, and will charge patrons of the Jewell Telephone Company 10 cents to talk to Ellsworth and Radcliffe, being a reduction of 10 cents.

OSWEGO, KAN.—John M. Rings has sold the Oswego Telephone exchange to the Farmers' Co-operative Telephone Company. Mr. Rings takes $1,500 of stock in the Farmers' Co-operative, and has accepted the position as manager of the exchange here.

PLEASANTON, KAN.—C. F. McClay has purchased the telephone line which runs from Osawatomie to Beagle, thence to Cadmus and here. Mr. McClay is thinking of continuing the line to Goodrich and Centerville and perhaps to Mound City.

SEDAN, KAN.—The Dosbaugh Telephone Company has purchased the Chautauqua county properties of the Home Telephone Company of Sedan. The Dosbaugh Company gets the Home exchanges at Sedan and Peru and the toll line to Elk City. It did not buy the Home Company's Elk City exchange, but will be connected with it. The Dosbaugh Company is composed of John and J. M. Dosbaugh, of Cedar Vale, and F. A. Whartenby, of Sedan. The Home Company is composed of J. T. Bradley, E. C. Ackarman, J. I. Crouse and Hugh Taylor.

CLIFTON SPRINGS, N. Y.—H. F. Flint's telephone business has been merged into a stock company, to be known as the Clifton Springs Telephone Company. The following are the directors for the first year: W. H. Burke, H. F. Flint, H. L. Wright, W. C. Ellis, J. H. Stephens, Dr. L. P. Conley, H. J. Bostwick. At a meeting of the directors the following officers were elected for the ensuing year: President, W. H. Burke; vice-president, J. H. Stephens; secretary, H. L. Wright; treasurer, W. C. Ellis; manager, H. F. Flint; executive committee, W. H. Burke, Dr. L. P. Conley, H. L. Wright. The company has a capital stock of $6,000, and will improve the lines already in use and also erect new lines in this vicinity.

DELHI, N. Y.—James F. Scott has sold his interest in the Andes and Delhi telephone line to S. F. Adee, of Delhi, who owns the local telephone exchange. Mr. Adee now has the controlling interest in the Andes line.

CRESSON, PA.—The Cambria County Telephone and Telegraph Company and the Cresson Telephone Company and the Northern Cambria Telephone Company will probably be consolidated.

PERSONAL

LEXINGTON, KY.—S. E. Burke has been selected by George Shanklin and the directors of the Fayette Home Telephone Company as manager for its plants in Lexington, Versailles and Midway, to take the place of J. K. Johnston, who resigned, to take effect the first of May or as soon thereafter as his successor could be secured.

WELLSVILLE, N. Y.—H. A. Benedict, who for the past six months has been in charge of the Elmira Telephone Exchange, has again taken the superintendency of the Wellsville Telephone Company. The increasing business of the Wellsville exchange and the extensive changes and improvements to be completed this summer made necessary his return. R. A. Stout, who has successfully managed the plant the last few months, will be in charge of the outside work and extensions.

UNDERGROUND

COLUMBUS, GA.—The Columbus Automatic Telephone Company has begun the work of laying its conduits for underground wires.

MISCELLANEOUS

SHENANDOAH, IA.—The Shenandoah and Farragut telephone companies will be connected very soon.

PLEASANTON, KAN.—The Mt. Carmel Telephone Company has made arrangements to connect with the Pleasanton line.

ROCKPORT, ME.—Rockport is the first town to make a protest against the new departure of the Knox Telephone & Telegraph Company in the matter of charging a toll between Rockland, Rockport and Camden, which went into effect May 1. A petition with between three and four hundred names has been circulated calling for a special town meeting to rescind certain rights of pole locations granted at the last town meeting to the New England Telephone & Telegraph Company for the erection of poles. This order was general and did not confine itself to certain streets. Another article to be voted on is a refusal to grant either the New England Telephone & Telegraph Company, the Eastern Telephone Company, or its successors, the privilege of erecting any more poles.

HYANNIS, MASS.—The lines of the new Cape Cod Telephone Company have been opened to business with twenty-five instruments installed. The central office is located in Hyannis.

GRANVILLE, N. Y.—The Granville Telephone Company now has direct connection with Troy and Albany. The new line is by way of Eagle Bridge, Johnsonville and Lansingburgh.

New Construction in the Field

BESSEMER, ALA.—The People's Telephone Company is erecting poles between Bessemer and Glenn Springs.

MENA, ARK.—L. N. Burnett, representing the Mt. Ida Telephone Company, of Mt. Ida, was here recently making investigations with regard to a long distance telephone from Mena to Hot Springs via Mt. Ida. Mr. Burnett says his company is constructing a line from Caddo Gap, and proposes to connect Black Springs and Slatington, and if he receives sufficient encouragement will build to this point.

CHATHAM, N. B., CAN.—The Miramichi Telephone Company is about to reconstruct the telephone exchange in Chatham. A complete metallic circuit will be run. A new, up-to-date switchboard has been ordered. The work is expected to be completed by June 1.

COLUMBUS, GA.—Charles E. Adams, of Charles, Ga., was in the city recently perfecting arrangements for the extension of his telephone system to Columbus. Mr. Adams is president of the Adams telephone system, connecting the towns of Lumpkin, Richland, Weston, Brooklyn, Louvale, Florence and Coffinton. It is Mr. Adams' intention to branch out in every direction south of Columbus, stringing telephone wires between all the principal points. Mr. Adams has recently purchased the Ledbetter telephone line in Stewart county.

WELDON, ILL.—W. H. Costley, local manager for the B. F. Wasson Telephone Company, has lately extended the lines of the company south of town, and is meeting with much encouragement. After finishing this work it is intended to start out in other directions, the first probably being toward Shiloh.

KNIGHTSTOWN, IND.—The Farmers' Telephone Company is extending its line to Warrington.

FONDA, IA.—The Northern Telephone Company will build a rural line to Coon township from Newell.

TABOR, IA.—The Tabor Telephone Company has completed an extension of its line north from Emerson for a distance of six miles, and is now putting in operation a new metallic line from Randolph to Shenandoah.

BILLINGS, KAN.—At a meeting of the Antelope Valley Telephone Company it was decided to build a line from Billings, thirteen miles south. After this is accomplished they expect to interest the people between there and Perry, and with the assistance of Perry extend the line to the county seat. The question of consolidation with the Billings-Tonkawa line was favorably discussed.

HOLTON, KAN.—The American Independent Telephone Company has purchased a lot and will erect a central building at once. They also expect

THE WEEK'S MESSAGES—Concluded.

to construct several telephone lines running north and west through the country for the convenience of the farmers.

GOFFS, KAN.—The Goffs Telephone Company will soon construct a number of rural lines.

GALENA, KAN.—The Galena Telephone Company is putting in an exchange at Scammon.

McPHERSON, KAN.—A rural telephone line is now being built south of McPherson to take in Turkey Creek township and connect most of the farm residents of that part of the county. Another line will soon be in process of construction north, which will connect the principal farm residences north of McPherson. There is also some talk of a line south of Galva, reaching down toward Mound Ridge.

PITTSBURG, KAN.—The Pittsburg Home Telephone Company will have its plant in operation by June 10. Rates are $1.50 per month for residences and $2.50 per month for business telephones.

SUMMERFIELD, KAN.—The Summerfield Mutual Telephone Company will build another new line running along the State line west and northwest for a distance of eleven miles.

WELLINGTON, KAN.—The Home Telephone Company of Conway Springs has completed a line to this place, and will establish an office here.

WINFIELD, KAN.—William Felt, of Winfield, is arranging to build a telephone line from Milan to Perth and Corbin this summer.

RICHMOND, KY.—The recently organized Madison County Home Telephone Company has been granted sixty days' extension of time by the city council within which to begin work. This company will be a branch of the Kentucky Independent System.

CHELSEA, MICH.—The Chelsea Telephone Company intends to rebuild its exchange.

BUFFALO, KAN.—W. K. Morse, of Benedict, was here recently getting subscribers to the line which the Wilson County Telephone Company intends running from Buffalo east, thence south to connect with the Chanute-Benedict line.

EDDYVILLE, IA.—The Eddyville Telephone Company has broken ground for the new party line running southeast of this city. It has also contracts for the construction of fifteen miles of new line west of town.

FENNVILLE, MICH.—The West Michigan Telephone Company has opened a central station in the city as a satisfactory renewal of its contract, which recently expired, with the Saugatuck & Gangees Company, which could not be arranged. It is understood that the West Michigan Company will build a line to Allegan.

BLOOMING PRAIRIE, MINN.—Albert A. Peterson, manager of the Steel County Telephone Company, was here recently canvassing for the new Geneva line. He secured thirty-five subscribers and feels confident that many more will subscribe. The company contemplates extending this line to Clark's Grove.

HENDERSON, MINN.—The Farmers' Mutual Telephone Company is running a line to Henderson. The wires are being placed on the poles owned by the Minnesota Valley Company.

LAKE CITY, MINN.—The Elk River Telephone Company is extending its lines into the country east and west.

LA PLATA, MO.—The La Plata Telephone Company is rebuilding its line between Atlanta and La Plata.

HOLBROOK, NEB.—Representatives of the Gosper and Holbrook Telephone Companies held a joint meeting at Holbrook recently and decided to use 18-foot poles for the line from Holbrook to Eustis.

NEHAWKA, NEB.—The Independent Telephone Company has wired the town and an exchange will be put in. The company is now putting in wires on all the country roads for the farmers.

WADESBORO, N. C.—The Wadesboro Telephone Company has just completed the work of putting in a telephone exchange at Morven. The exchange is connected with Wadesboro by one metallic and one grounded circuit. There are also connections with Chesterfield, McFarlan and other long distance country lines. The work was in charge of W. T. Rose.

BISMARCK, N. DAK.—The Bismarck Telephone & Electric Company is obtaining a right of way for a long distance telephone line to Jamestown.

TRENTON, N. J.—The Interstate Telephone Company has begun active work in Millville, and all of the lines are being placed underground in the main streets.

BUFFALO, N. Y.—It is stated that the Interocean Telephone Company has purchased the franchise held by the Rochester Telephone Company in Charlotte and is erecting poles there. It is understood that many farmers in the town of Greece have subscribed, and that an exchange will be built in Charlotte.

ITHACA, N. Y.—The Ithaca Telephone Company has begun the construction of the line to Danby, which was delayed by the non-arrival of poles.

MORRIS, N. Y.—At a meeting of the directors of the Butternut Valley Telephone Company it was decided to increase the capital stock from $3,500 to $6,000. It was also decided to build a double metallic circuit to New Berlin, and to let the contract to F. C. Ward, of Cooperstown. A metallic circuit will also be put in on the line between Morris and Garrattsville.

TROY, N. Y.—The Rensselaer Telephone Company is laying across the river a submarine cable that will connect with the Home Company at Albany, thereby connecting the local company with 2,000 telephones. The cable will contain twenty-five pairs of wires. A connection will shortly be made with Schenectady.

VIRGIL, N. Y.—The Virgil and Dryden Home Telephone Company, which was organized a short time ago with R. F. Saltsman as president, has the poles distributed ready for setting. The line runs from Dryden to Virgil.

WALTON, N. Y.—Poles have been set between Franklin and Westbrook for the telephone line which E. A. Mackey, of Franklin, is about to establish. This line may be continued to Walton later. John Brice, of Hamden, also has men at work on a line through this section from Walton to Miller's Station. The poles are up and ready for the wire.

CLEVELAND, O.—The Cuyahoga Telephone Company is getting estimates on the cost of putting in a new switchboard in the Electric building. The present switchboard is not of the best, and the company has decided that it needs a central energy board.

MARYSVILLE, O.—The Marysville Telephone Company has received the poles and other material for its new line to Peoria. There will also be a new toll line to Peoria, giving direct service.

CENTER, PA.—The stockholders of the Susquehanna Valley Telephone Company, at a meeting held at Centre Village, voted to raise $2,000 for the purpose of improving the lines.

CONNELLSVILLE, PA.—The Tri-State Telephone Company is constructing a trunk line to Fairchance. The two new trunk lines to Connellsville are completed and the new switchboard is in at Scottdale. A large force of men are at work both in Uniontown and Connellsville putting the lines in condition.

TAMAQUA, PA.—The United Telephone & Telegraph Company has under consideration the question of extending its service from Tamaqua to Seek, Coal Dale, Lansford, Summit Hill, Nesquehoning and Mauch Chunk.

LYNCHBURG, VA.—The Campbell County Telephone & Development Company, which was organized last January with a capital of $5,000, has secured the right of way for a line from this city to Brookneal via Rustburg, Gladys and Naruna. The company expects to connect at this end of its line with the Lynchburg Telephone Company, and at the other end with a local system in Charlotte county. The officers of the company are: R. G. Robertson, of Lynchburg, president; W. T. Oakes, of Gladys, vice-president; Thomas Whately, of Kew, secretary and treasurer; directors, the foregoing and Dr. W. L. Williams and Messrs. W. B. Clay and W. A. Price; attorney, Howell C. Featherston, Lynchburg.

ZILLAH, WASH.—The Christian Co-operative Telephone Company of Sunnyside has completed a line from Sunnyside to three miles north of Zillah, and nearly all the farmers are putting in telephones.

PIEDMONT, W. VA.—The Piedmont & Keyser Telephone Company is putting in a new switchboard, new telephones and fixing up the wire plant.

WHEELING, W. VA.—Work on the lines of the National Telephone Company between Pittsburg and Wheeling, which was begun about a year ago, is now being actively pushed ahead at the Pittsburg

TRADE NOTES

THE AMERICAN ELECTRIC TELEPHONE COMPANY, Chicago, is equipping the Independent switchboards at Mansfield and Zanesville, Ohio, with selective keys on every cord circuit, adopting the American four-party selective signaling system. The indications are that Ohio will take the lead in party line work, just as it did in the development of the Independent field.

THE NEW HAVEN NOVELTY MACHINE COMPANY, New Haven, Conn., announces that its business has increased to such an extent that it has made arrangements to open an office in Chicago at 1112 Merchants' Trust and Loan Building. This office will be in charge of Mr. H. J. Minhinnick, formerly electrical engineer for the Cedar Rapids and Marion Telephone Company. The company has also arranged to have its novelty cable sleeves, Y-branches, pot heads and its line of patented novelties carried by the principal supply dealers, and before the summer is over will have agencies with all the principal jobbers.

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TELEPHONE MEETING CHICAGO BRANCH A. I. E. E.

THE Chicago branch of the American Institute of Electrical Engineers held its telephone meeting on Tuesday, May 19. The meeting was well attended, and from the Independent standpoint was the most important of the telephone meetings of the various branches of the Institute this year. The other branch telephone meetings were all based on the proceedings of the February meeting of the Institute held in New York. The Independent side of the question was not well represented. In Chicago, however, the meeting was a joint one between representatives of both Independent and Bell engineers. The scope of the meeting, therefore, was considerably enlarged from that of the New York meeting and the branch meetings. The Independent side of the discussion was represented by William W. Dean, engineer for the Kellogg Switchboard and Supply Company. He took as the subject of his paper "A System of Selective Signaling for Telephone Lines." This is a subject of the utmost interest to telephone men, and at present is probably the most talked of problem in the telephone engineering field.

Mr. Dean opened his paper with a description of the salient features of existing selective signaling apparatus. His arguments were advanced particularly with the view to pointing out the alleged weaknesses of all such existing systems, which he has endeavored to improve in designing his new system. He then gave a detailed description of his system, which was listened to with much interest by all present. It is based on the tuned reed principle. This principle is an old one to telephone men, having been experimented with to a considerable extent. It has never before, however, been put into successful practice. Mr. Dean described fully the essential features necessary to obtain effective mechanical tuning of the reeds. He brought out many features of practical interest never before published, and which will form a very valuable addition to telephonic literature on this subject.

Mr. Dean gave a working exposition of his system, showing a complete central office equipment, with four instruments for use at four subscribers' stations on a single line.

The two other papers presented at the meeting were by Bell engineers. S. G. McMeen, of the engineering department of the Western Electric Company, read a paper "Concerning the Telephone Engineer." He pointed out the fact that a telephone engineer is rather held in contempt by electric light and power engineers. But he showed that a telephone engineer really faces the hardest kinds of electrical problems. To be a successful telephone engineer, a man must have a practical knowledge of every branch of the electrical and mechanical engineering professions.

J. G. Wray, superintendent of Equipment of the Chicago Telephone Company, presented a paper on "Some Features of Telephone Traffic and Their Effect Upon Service." It gave a good deal of information on the traffic side of engineering that will be of interest to Independent engineers and operators. The last two papers are printed in this issue. Mr. Dean's paper will appear later.

SOME FEATURES OF TELEPHONE TRAFFIC AND THEIR EFFECT UPON SERVICE*

By J. G. Wray, Supt. of Equipment, Chicago, Telephone Co.

TRAFFIC in the strict acceptance of the term implies the transfer of commodities from one person to another. We may consider exchange of ideas over a telephone wire from one person to another as a form of traffic, and such a construction may put telephone calls within the meaning of the word.

Consider first the part the subscriber plays in telephone traffic and in making good or bad service, for the subscriber's part is an important one and often militates against good service. Who has not called for a number and, after waiting for a few minutes, hung up the receiver with imprecations against the telephone service? In the meantime the telephone apparatus has perhaps performed its functions properly and the operator is in a fair way to get the called subscriber. When the latter answers, he may not have answered promptly, and finds no one on the line, he, and not the calling subscriber is certainly the aggrieved party. False calls are a frequent and annoying source of complaint against the service and are caused in many ways in addition to the one just named. The calling party may give the wrong number or the wrong office. The number of office may be misunderstood by the operator, or the calling subscriber may change his mind and decide not to make the call. In case the call is from a subscriber in one office to a subscriber in another office, there is always a chance of a misunderstood number resulting in a call for the wrong party

I recently noticed a curious fact in observing traffic from 10-party line subscribers in a city not 1,000 miles from Chicago. I noted the extreme smoothness and accuracy of the service, the apparent absence of any hitches or complaints, and was surprised when I learned that the operator's load was practically 30 per cent. higher than operators' loads in similar service in Chicago. I can explain this condition only by assuming that the operator had the intelligent and courteous co-operation of the subscribers and this was apparent from such observations as I was able to make during a two hours' visit in the office.

Calls should be answered promptly lest they may become lost and the called subscriber lose a chance for an important business transaction. Prompt answering and short conversations will always tend to keep the line free for other inward calls and will minimize busy calls, which more than anything else are a source of bitter complaint.

Practically 20 per cent. of all calls made are never completed because the line called for is busy. This feature of telephone traffic is one of the most aggravating to the subscriber, but unfortunately is almost beyond the control of the telephone company.

Other things being equal the busy reports that may be expected from telephone lines will become more numerous and will increase with the number of conversations over that line. In actual practice, other factors enter: The New York City telephones, for example, are reported busy about as often as the Chicago telephones. The number of conversations per line on New York telephone lines is much less than on the Chicago lines. We would therefore ordinarily expect fewer busy reports from the New York lines. The other factors entering in this particular case are undoubtedly shorter conversations by Chicago telephone users and a disposition to rent additional telephone wires where circumstances seem to warrant it. Another factor which has even greater bearing is the fact that the New York City telephone calls are crowded into a shorter day and that hour for hour the lines are nearly as busy as in Chicago.

Leaving further discussion of the part the subscriber may have, we have only to remark that if the subscriber would exercise the same courtesy and good judgment in his use of the telephone that he would show under ordinary circumstances in dealing with his business acquaintances face to face, there would be a marked improvement in the service and the trials of the unjustly maligned telephone operator would be considerably mitigated.

Uniform answering with rapid and accurate service can only be accomplished by giving an operator enough calls to keep her busy and not more than she can handle properly and by minimizing the work on each call. The service may be considered as being good when the average answering is in 6 or 7 seconds, and when say 95 per cent. of all calls are answered within ten seconds. This grade of service is obtained only under favorable conditions. The operator must have enough calls to keep her busy, yet not overloaded, and she must be continuously under a competent supervising operator. The practice is to have a supervisor for every eight or ten operators. This supervisor should work under the direction of a chief operator.

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*A paper read before the Chicago Branch A. I. E. E., May 19, 1903.

A second requisite of good service is that the time and operations required of an operator on each individual call shall be a minimum. Obviously the operator has no time for discussions with the subscribers on the merits of a complaint. These are turned over to the supervising operator for adustment. It is the aim of the operating manager to so control the two factors just named that good service will result. By the proper manipulation of the intermediate distributing board he may, by increasing or decreasing the number of lines that an operator must answer, keep the operator's load uniform under the fluctuations of traffic.

In a typical telephone exchange the load curve shows during the midnight hours a value of from 1-10th of 1 per cent. to 5 per cent. of the maximum hourly load. This period of light load will vary from 7 to 14 hours, depending upon the location of the exchange and the habits of the telephone users. In the offices of the business district of a city like Chicago, very few calls are made between 7 p. m. and 7 a. m. Between the hours of 10 p. m. and 7 a. m. the calls per hour will vary from 1-10th of 1 per cent. to perhaps 1 per cent. of the maximum. Between the hours of 7 and 8 in the morning traffic will rise to perhaps 5 per cent. of the maximum. The rise will be extremely rapid until the maximum load of the exchange is reached, between 10 and 11 in the morning. About the noon hour there is a cessation of business and the telephone traffic curve shows a drop of perhaps 40 per cent. below the maximum. After the lunch hour, when business has been resumed, the traffic curve rises to an afternoon maximum between 2 and 3 o'clock. This maximum will be less than the maximum in the morning, and will in a typical office approximate 80 per cent. of the maximum traffic of the day. From 3 o'clock until 5 or 5:30 p. m. there will be a rapid decrease in the traffic load, with an almost complete cessation of business at 6 o'clock.

In a resident district the slump of traffic at noontime is not very well marked. There is, however, a decrease in the number of calls made late in the afternoon and a corresponding increase in the number of calls for the telephones of a residence district, the latter arising from the fact that the head of the house wishes to explain why he cannot come home for dinner or to announce that he wishes to bring a friend. The evening traffic is also a feature of the residence district. Social calls are made, appointments for the theatre, invitations, etc., etc. Evening traffic of a residence district often continues heavy until 9 or 10 o'clock; indeed, in one of the Chicago offices the evening traffic runs from 30 to 60 per cent. of the maximum, and heavy traffic is maintained until nearly midnight.

Telephone traffic varies with the seasons as well as with the time of day. Canal office district of the Chicago Exchange shows a fluctuation of 50 per cent. between summer and winter traffic. This is caused by the vast number of interests of the district which practically close down during the winter months. There is a heavy rush of traffic in April and May, followed by a 40 per cent. reduction in traffic during July and August. In the fall business increases to a maximum in September. This is followed by a 50 per cent. reduction in traffic culminating in January. A change in the character of the traffic from Canal district, however, has been noticed within recent years and the wide variations of traffic with the seasons are less marked. This is undoubtedly due to the change in the character of the district with the gradual building up of vacant prairie with residences, small shops, saloons, etc.

The traffic of all offices slumps decidedly during the summer months. There is a reduction of perhaps 30 per cent. during July and August, the vacation period.

The volume of traffic of a telephone exchange is also an unfailing index of general business conditions. This is shown by the fact that during 1894, 1895 and 1896 there was a very slight increase in traffic. With the return of prosperity, however, the traffic has increased by leaps and bounds until now it will approximate four times as heavy as during 1895 and 1896.

The traffic of Saturday forenoon is always the heaviest of the week, and is taken as a basis for the adjustment of operators' loads and the loads on trunk lines. The adjustment of the operator's load must be made with a view of handling the traffic well during the busiest hour of the day. Experience has show that approximately ⅛ of the business of the entire 24 hours must be handled during the busiest hour.

From the above it can be readily seen that the capacity of the operators and the physical telephone plant must be extremely flexible to take care efficiently of the rapid and extremely wide fluctuation in loads just described.

To the advantage of the telephone manager, be it said that the human machine is extremely well adapted to handling this fluctuating load. A well trained operator will frequently take 3 or 4 calls in rapid succession and complete them almost simultaneously.

Just a word on the efficiency of the telephone plant. Assuming an efficiency of 100 per cent. when all the subscribers' lines are in use all the time, we find that in actual practice they are working under an efficiency of only 2 or 3 per cent.

Assuming 100 per cent. efficiency when the apparatus used by an operator is in use all the time, we find that in actual practice it is working under an efficiency of 25 per cent.

Thousands of dollars' worth of multiple jacks lie in the switchboard, and are practically idle. Some are perhaps never used.

The traffic of a telephone exchange determines the capacity and design of a telephone central station equipment and the size of its operating force. Changes in traffic, whether a decrease due to business depression, a change of contracts to a message rate basis, or to any other cause; or an increase caused by new telephone subscribers, by better business condition or perhaps by a change of policy in the matter of party lines or private branch exchanges, must be met promptly by a corresponding readjustment of facilities and operating force to enable the business to be carried on economically and well.

CONCERNING THE TELEPHONE ENGINEER*

By S. G. McMeen, Engineering Department of the Western Electric Co., Chicago.

THE telephone engineer's occupation is so varied in its contact with commercial and social conditions that its scope is apparently not well understood even by those practicing similar professions. Indeed, the very existence of the telephone engineer is in some quarters denied.

To many persons the telephone instrument on the wall is the telephone system, and an art based on so little a thing seems a simple one. Yet there are involved the problems of apparatus design for electrically transmitting speech at the highest efficiency for the least and greatest distances without change of local equipment, and of receiving speech and signals from distant stations. These are three distinct and finite things, for each of which a "best way" must be determined.

Granting that the sub-station telephone set stands for too narrow a view of the whole matter, and that at least a connecting line is concerned, it is suggested that there is involved a problem of an alterating current transmission line. Due to conditions of topography and degree of congestion of population, the line may be buried or erected among a wide variety of surroundings, but must keep within the scope of this best way. As its insulation, capacity and conductivity have vital bearing on its efficiency of performance, and as they also govern its cost by the character of their design, a responsibility rests with the engineer who is to control the degree of investment by his decisions on these points.

For example, "If by decreasing the electrostatic capacity between wire and wire of an underground telephone cable by *b* microfarads the efficiency of transmission is increased by *d* per cent., at a cost per mile per year of *c* dollars, is the expense warranted? Instances might be multiplied to prove the importance of knowledge and judgment in connection with this costly and important portion of a telephone system.

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*A paper read before the Chicago Branch A. I. E. E., May 19, 1903.

To the telephone sets and system of lines must be added the central office equipment. Of the switchboard and its appurtenances three features are important: its most striking attribute being that of multitude of things; second, that the parts must be organized to inter-operate with complete harmony; and third, that the whole aggregation is often of such respectable size as to compare favorably with the work of an engineer of any other craft.

Location of central offices, their sizes, now and hereafter, the number, size and character of underground ducts and cables, must be considered for one conclusion, the giving of the best telephone service at the least cost, now and hereafter. And it is not to be overlooked that the factors upon which the solution depends are themselves subject to change, so that the probabilities of the occurrence, amount and direction of such change must be foreseen and discounted if possible.

It may be responded that all other engineers must take account of rates of interest, prices of material and labor, density of population, etc., and possible shifting of values. Granted; but a telephone system must be planned and begun, it is believed, a longer time before its development to its ultimate size than is true of most other works of magnitude. Because the speaking current of the telephone is a very small one, usually alternating, and so not susceptible of easy and exact measurement by simple means, there has grown up the idea that the telephone engineer does not deal with exact quantities, and does not use in his work that accuracy of observation and precision of execution which make the engineering profession a worthy one. It does not appear that this impression is correct, and there are two principal reasons why not: First, the speech transmission current is far better understood to-day than formerly, and is determined with a very great degree of accuracy and certainty, as well as are the many other currents having to do with the operations attending speech transmission.

Second, the telephone engineer requires the same qualities of observing and reasoning powers which distinguish engineers in general. As a single instance of the possibility of mathematical and physical accuracy, witness the work of Professor Pupin in the matter of distortionless circuits.

Upon the basis of these thoughts, may we not define as follows:

A telephone engineer is one who practices the design and construction of telephone apparatus, telephone circuits and telephone operating methods, and the correlation of all three into systems of telephonic communication.

If the definition be granted, let us then claim a place for him among the engineers of more classical reputation, giving him credit for his accomplishment and our best wishes for his future.

OHIO TRAFFIC ASSOCIATION MEETING

THE Ohio Independent Telephone Traffic Association, which was organized several months ago for the purpose of perfecting toll arrangements in that state, held a meeting at the Chittenden Hotel, Columbus, Ohio, on May 12, 13 and 14. Fifty-eight stockholders were present, representing as many of the largest companies in the State of Ohio. President W. Gilbert Thompson, Lebanon, included in his report a resume of the plan by which the company was organized at its meeting in Cleveland, February 6, 1903. He called attention to the splendid support which had been given the officers by the stockholders, and showed in detail the fine results which have been secured in the three months of the company's existence. He also called attention to the success with which the company had met in standardizing not only various classes of equipment, but nearly every kind of stationery for which telephone companies have use, and that the great effect of this standardizing was the economy to the various operating companies who are members of the Traffic Company, as it enabled the Traffic Company to purchase in extremely large quantities and sell to its members in small quantities at the large lot price. He closed his address with recommendations to the effect that the general office of the company should be moved to Columbus, Ohio, and that officers should be paid a salary in addition to their regular traveling expenses. Immediately upon the close of his address these two questions were discussed, and vote of the stockholders resulted in the decision to retain the office in Cleveland, Ohio, and to allow all members of the Board of Directors their traveling expenses whenever on company business. It was pointed out by H. H. Robinson, chairman of the Executive Committee, that while the directors undoubtedly had the right to expect compensation for their services, that the company was as yet too young to undertake an expense of this nature, although later it might be practicable.

The manager's report prepared by Walter Green, general manager of the Independent Telephone Traffic Company, showed that on February 6, $11,366.25 was the business that had been transacted for the members at a profit to the company in the three months of 2½ per cent. net on its entire capital stock, or nearly 100 per cent. on the amount of stock paid in. His report also showed that the Traffic Company did not owe one dollar which was due, and had no accounts on his books against operating companies which were overdue. An analysis of his report in detail showed that a saving had been effected to the operating companies of about 10 per cent. on supplies purchased through the company. In the afternoon the following officers and directors were elected:

W. G. Thompson, Lebanon, president; Jerome Penn, Washington, C. H., vice-president; W. F. Crossley, Salem, second vice-president; A. V. Hageman, Lorain, O., secretary and treasurer; Walter Green, Cleveland, O., general manager. Executive Committee: H. H. Robinson, chairman, Cleveland, O.; W. G. Thompson, Lebanon, O.; A. H. Doudna, Bridgeport, O. Directors: W. Gilbert Thompson, Lebanon, O.; Jerome Penn, Washington Courthouse, O.; W. F. Crossley, Salem, O.; A. V. Hageman, Lorain, O.; H. H. Robinson, Cleveland, O.; A. V. Doudna, Bridgeport, O.; C. E. Yoder, Bellefontaine, O.; J. G. Palmer, Conneaut, O.; Eugene E. Knox, Portsmouth, O.

On Wednesday the following papers were read: "Reduction of Expenses in Exchange Operation," by F. V. L. Turner, general manager of the Cuyahoga Telephone Company, of Cleveland; "The Farmer Line Problem," by O. F. French, assistant general manager of the Federal Telephone Company, of Cleveland; "Development of the Small Exchange," by Howard Schwartz, general manager of the Star Telephone Company, of Ashland.

On Thursday the following was the program: "How to Make County Toll Line Systems Profitable," by M. M. Herron, general manager of the Millersburg, Wooster & Orrville Telephone Company, of Millersburg; "Economy in Long Distance Operation," by H. H. Robinson, general manager of the U. S. Telephone Company, Cleveland; "The Value of Standardizing," by H. C. Devin, general manager of the Mt. Vernon Telephone Company, of Mt. Vernon.

On Thursday afternoon the delegates made a trip of inspection of the plant of the Citizens' Telephone Company, of Columbus.

In connection with these meetings the Independent Telephone Traffic Company had on exhibition in an adjoining parlor samples of telephone supplies, equipment, etc. Goods of the following manufacturers were displayed: National Carbon Company, Williams Abbott Electric Company, Gordon Battery Company, Hemingray Glass Company, F. Bissel & Co., Vought-Berger Company, Ingram Richardson Company; Harloe Insulator Company, Wharff Eaton Company, Roebling Sons Company, Wentworth & Blake, Lawrence-Hall Electric Company; Kellogg Switchboard and Supply Company; W. N. Matthews & Bros., D. & W. Fuse Company, American Toll Telephone Company. A great deal of interest was shown in this exhibit, and those present expressed themselves as very much pleased and benefited by the discussion prompted by this display.

TELEPHONE EXCHANGE ENGINEERING—ARTICLE IX
CHIEF OPERATOR'S CIRCUITS

By Ray H. Manson, Albion D. T. Libby and Chas. A. Simpson.

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The circuit shown in Fig. 8 is the circuit for the chief operator's cords and telephone set. The "calling" side of the circuit, or the side having battery, is used, first, in connection with circuit shown in Fig. 12 for calling and conversing with regular subscribers. Second, for calling a regular subscriber who may be connected with circuit shown in Fig. 11.

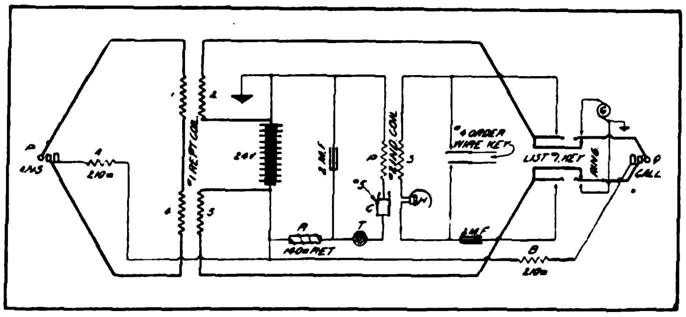


FIG. 8—CHIEF OPERATOR'S CORD CIRCUIT.

The "answering" side of the circuit or the side which is not provided with battery is used, first, in connection with circuit shown in Fig. 9 for calling in on the multiple board as a regular subscriber; second, in connection with circuit shown in Fig. 10 when listening in on an operator's conversation; third, with the circuit shown in Fig. 14 for talking to the wire chief; fourth, in connecting with circuit shown in Fig. 11 when a subscriber with whose line it may be connected calls in on the multiple board.

The apparatus shown on the right of the dotted line in Fig. 9 is located outside the chief operator's desk and that shown on the left is located in the desk. The two relays on the right are located on the relay rack and the jacks *c c* are multipled throughout the multiple board. If an operator wishes to talk to the chief operator she will insert one of her calling plugs into a jack, *c*, which will operate the cut-off relay and thus give a clear circuit through the 600 ohm winding of the relay at the chief operator's desk. The operator will now throw over her ringing key, which will cause the ringing current to pass through the two M. F. condenser and the 600 ohm winding, causing the armature at the right to be attracted and letting the shutter on the left fall. The falling shutter closes a battery circuit and lights the lamp *b*. The chief operator will answer the call by plugging into jack *d* with plug *P*. Battery will then flow through the 210 ohm resistance coil, Fig. 8, through the ring of jack *d*, Fig. 9, through the 45 ohm relay winding to the other side of battery. This will restore the relay shutter and put out the lamp *b*. The operator will now be able to talk to the chief operator. When the conversation is through the chief operator will pull down her plug first, which will light the regulator operator's supervisory lamp, who will then pull down her plug.

The chief operator can also call on the multiple board over this circuit, Fig. 9, by plugging into jack *d* with plug *P*. Battery will then flow through the line relay, No. 1, out over the line through the windings No. 4 and No. 1 of the repeating coil and back to the other side of battery. This will actuate the No. 1 relay, which

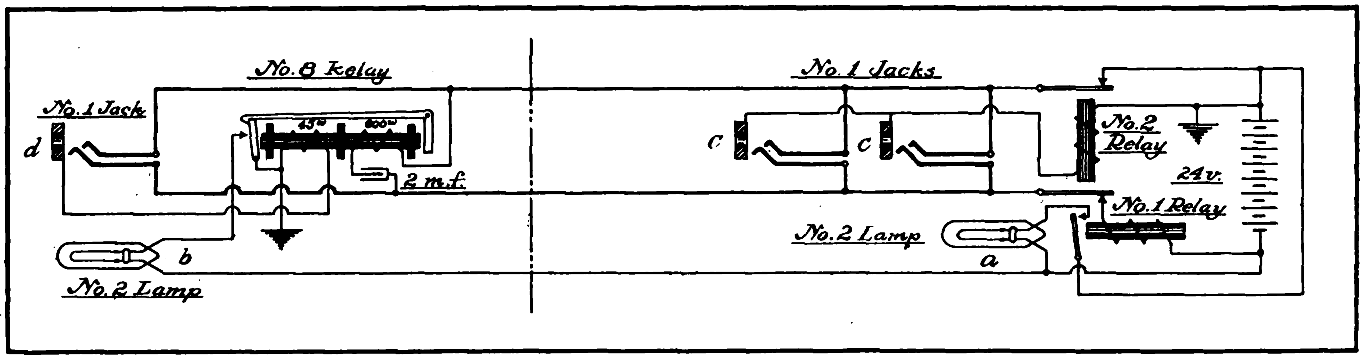


FIG. 9—CHIEF OPERATOR'S LINES TO MULTIPLE BOARD.

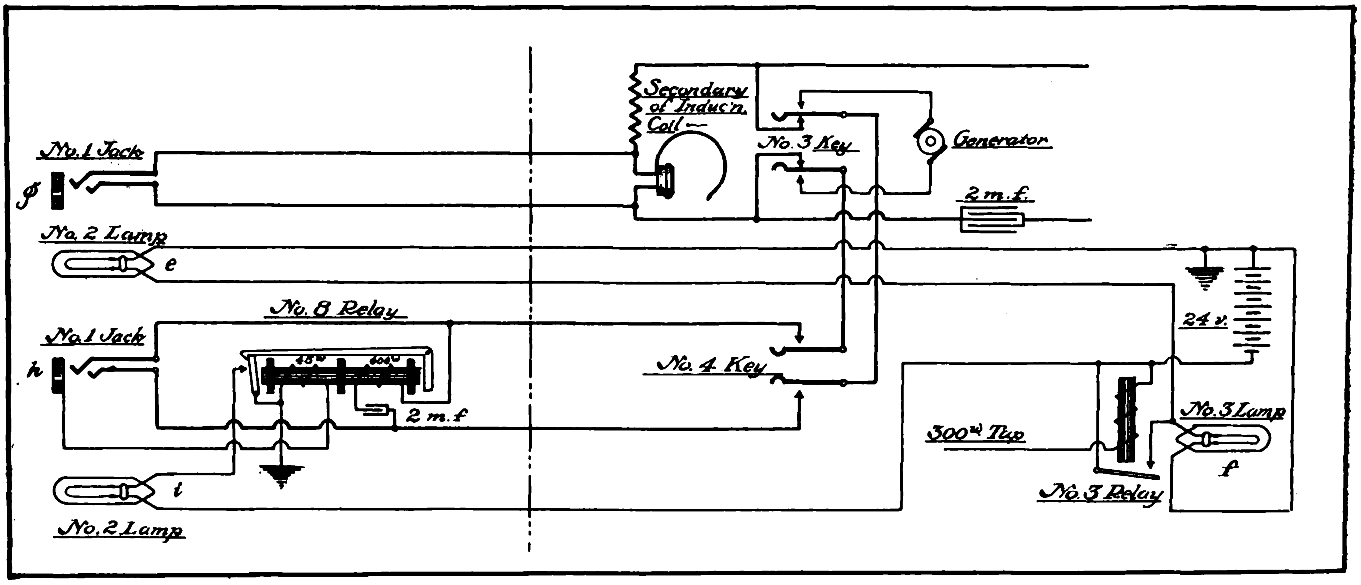


FIG. 10—CHIEF OPERATOR'S LISTENING IN AND PILOT CIRCUIT.

Editor's Note.—The first article in this series appeared in the issue of November 22. They will continue many months.

will close battery through the lamp *a*. The regular operator will then answer the call as a subscriber's call.

There are three circuits shown in Fig. 10. The upper one consists of the spring jack *g*. This circuit is called the "listening in" circuit. A jack is provided for each operator and is wired to the secondary of the local operator's telephone set, and tapped in multiple with the receiver. By plugging into this jack *g* with plug *P*, Fig. 8, the chief operator can hear anything the local operator says, and if the chief operator cuts out her transmitter by throwing her key *c* before plugging in, the local operator will not be aware that the chief operator is listening.

Fig. 10 is another circuit and is called the "line pilot" circuit. A lamp is provided for each local operator and each lamp is wired in multiple with the position calling pilot lamp. Whenever a call comes in at a local position the auxiliary relay No. 3 operates, which closes battery through the common position pilot lamp and also lamp *e* (see Fig. 10). It will be seen then that as long as there is a call at a local position which has not been answered, the lamp *e* will show the fact to the chief operator. This will enable the chief operator to observe how quickly the subscribers' operators answer the calls.

The third circuit in Fig. 10 consists of the jack *h*, lamp *i*, and relay No. 8. This circuit is used by the incoming trunk operator to call up the chief operator. The incoming trunk operator, by throwing key No. 4 and then key No. 3, will send ringing current through the 600 ohm winding of the relay, thus throwing the shutter, which will close a circuit through the lamp, *i*. The chief operator will answer the call with plug *P*. As soon as the chief operator plugs into jack *h* the relay will be restored and the lamp *i* will be put out. The incoming trunk operator can talk to the chief operator as long as she presses the key No. 4 and leaves key No. 3 in its normal position.

AS TO FIGHTING THE DEVIL WITH FIRE

CLEVELAND, ATLANTA AND RICHMOND INDEPENDENTS.

Editor THE AMERICAN TELEPHONE JOURNAL:

I HAVE carefully read your editorial in the April 25 issue of THE JOURNAL, entitled "Why We Fight the Devil with Fire, A Broad Telephone Policy Impossible," and wish to thank you for your defense of the Independent situation.

The writer probably has a better knowledge of the exact status of the Richmond, Atlanta and Federal properties than our correspondent from Colorado Springs or the Mining Investor, having been intimately connected with Atlanta and Richmond, and now being in charge of the Cuyahoga Telephone Company, at Cleveland, Ohio.

The Atlanta Standard Telephone Company, on June 10, 1902, at the request of the City Trust & Safe Deposit Company, of Philadelphia, as trustee for the bondholders, was placed in the hands of receivers. It is a well-known fact that not a creditor lost a single cent. It is a well-established fact that the Atlanta Standard Telephone Company, since its reorganization, is in better financial condition than the Southern Bell Telephone & Telegraph Company, whose stock is not even listed and whose dividends, if any are paid, come from the treasury of the parent company.

The Richmond situation is patent to the entire telephone community, and, as you say, "The Bell Company paid the shot."

It is absolutely safe to say that the entire Federal proposition, inside of sixty days, will not only be in a position to continue the fight that it has maintained since its inception, but will be doubly able to do so, and that the avowed intention of the Bell Company to crush the Ohio Independent industry (primarily the Federal properties, including its long-distance connections) in the shortest time possible will be one of the most expensive bits of amusement in which our friend the enemy has indulged.

A resume of the present condition of the Central Union and Cleveland Telephone Companies is the best possible evidence of the effect of competition.

The Atlanta company is to-day in a position to more than care for itself under the stimulus of thorough management, and the reduction in the operating expenses of the Cuyahoga Telephone Company to 45.88 per cent. as to actual income shows what can be done with these properties.

There can be no question of the other Federal properties coming to approximately the same basis, as we will be able to show in the course of the next two or three months.

When Mr. Fish, in his annual report, stated that it was time to throttle the telephone output, he must have seen the handwriting on the wall. For since that time, the Central Union's report has been issued, and an issue of one hundred millions of stock has been asked for. And the Michigan Bell stands ready to receive a few more carloads of gold.

F. V. L. TURNER, *General Manager*,
CUYAHOGA TELEPHONE COMPANY,
Cleveland, Ohio.

April 28, 1903.

SOUTH A SPLENDID FIELD FOR INDEPENDENTS.

Editor THE AMERICAN TELEPHONE JOURNAL:

I HAVE read with much interest the editorial in your issue of April 25, "Why We Fight the Devil with Fire." I do not like the heading. Pardon the suggestion, but it would be more correct to say, "Why We Fight the Devil with Facts," for this is just what you are doing. Every Independent telephone exchange management should take THE AMERICAN TELEPHONE JOURNAL. I know of no other paper on telephony that stands anywhere near THE JOURNAL. THE AMERICAN TELEPHONE JOURNAL is the friend of every investor in Independent telephony, to say nothing of the thousands of men engaged in one position or another in this industry. Every officer, operator and lineman should subscribe to THE AMERICAN TELEPHONE JOURNAL, as well as every person who has invested.

The statements made in THE JOURNAL in regard to the methods of the Bell Telephone Company in trying to discourage further progress in the Independent field are cold facts. One of the Bell methods in the South at present is to frighten owners of Independent exchanges into renting old Bell telephones that have had to be replaced in larger cities with new instruments in order to meet the competition of the Independents. They send a good, bright man, sometimes accompanied by a gang of workmen, to a town operated by a small Independent company. The bright man usually says something like this to the Independent owner:

"It has not been our custom heretofore, and is not our desire now, to interfere with small exchanges that have a right to build and operate plants. But, as our long-distance service has created such a great demand for our connections, we are forced to either make arrangements by which you agree to use our instruments or we shall be obliged to install our own plant and force you from this territory. It would, in our opinion, be much better for you to raise your rates, rent our telephones at $6 per year, or 50 cents per month. We will allow you $6 for your old telephones and you can apply this to the rental of our instruments. You must discard your present switchboard, as we will furnish a board of our own make. You must not connect with any Independent system. We will form a stock company, of which we shall own the controlling interest, and you may take as much of the remainder as you wish."

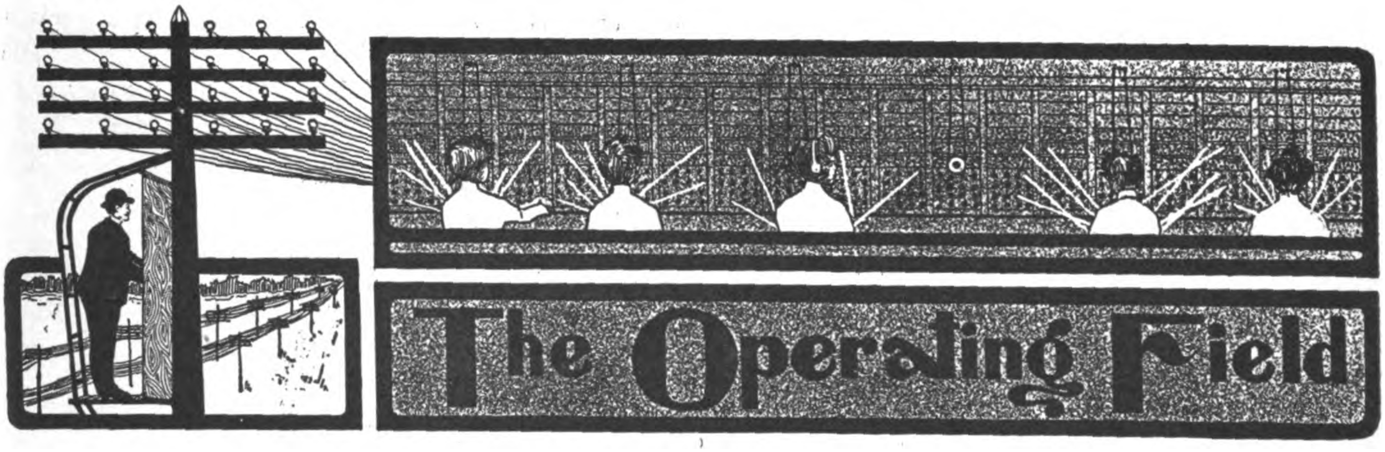
A number of timid operators in the South have succumbed to this sort of argument. The telephone rates are raised and the Bell at no expense whatever takes $6 a year for each telephone and the innocent subscriber has to pay the increase.

If THE AMERICAN TELEPHONE JOURNAL had been read from a business standpoint by these people they would not even have listened to such a proposition from the Bell. They would have known that this was only a "Bell bluff," which would do them no more harm than the bark of a dog.

There is a wide field for Independent telephone development in the South. In my opinion it is one of the best sections in the country for the Independent industry.

J. A. HELVIN,
Charlotte, N. C.

April 27, 1903.



The Operating Field

CONVENTION DATE OF NATIONAL ASSOCIATION.

CHICAGO has been fixed as the place for holding the annual convention of the Independent Telephone Association of the United States. The Association will be in session two days commencing June 24th. This action was taken at a recent meeting of the advisory board held in Chicago. At this meeting a local committee representing manufacturers and newspaper interests, was asked to serve as a committee on local arrangements. A program has been arranged and responses from those who are expected to take part are being received. As soon as everything is definitely fixed the program will be announced. One of its features will be the report of the special committee on patent litigation which had charge of the Berliner patent suit and the Carty patent suit, both of which suits have been won by the Independent interests. The officers of the Independent Telephone Association are as follows:

James M. Thomas, president, New York, N. Y.; Hugh Dougherty, first vice-president, Bluffton, Ind.; C. E. Stinson, second vice-president, Memphis, Tenn.; W. H. Durin, third vice-president, Cedar Rapids, Ia.; J. B. Ware, secretary and treasurer, Buffalo, N. Y.; C. E. Wilson, first assistant secretary, Philadelphia, Pa.; Edward L. Barber, second assistant secretary, Wauseon, Ohio; T. B. Lee, third assistant secretary, Pittsburg, Pa.

THE CINCINNATI, OHIO, FIGHT.

INDEPENDENT telephone companies seeking an entrance to Cincinnati, Ohio, have asked the Probate Court to condemn certain streets and alleys on which they can lay underground conduits for telephone and telegraph wires.

The Fitzsimmons Telephone Manufacturing Company, through Attorney Homer Morris, has filed a condemnation suit in the Probate Court to use alleys and streets, and also the Cincinnati Telephone Company filed a similar suit. Both companies seek to acquire conduits in central territory, taking in most of the business and manufacturing districts. Powel Crosley is one of the promoters of the Cincinnati Telephone Company, and it is understood that his concern has an agreement with the Fitzsimmons Company. The Cincinnati Company now has a telephone line from the city to Lebanon, Ohio, while the Fitzsimmons Company has some private lines strung in various parts of the city. Both companies have franchises to do a telephone business.

Both companies assert that they attempted to agree with the city authorities for the use of streets and alleys, but received no satisfaction, and they have resorted to the Probate Court, under the statutes providing that when the company and the city authorities cannot agree as to the mode of using the streets, the Probate Court may be appealed to in condemnation proceedings.

City Solicitor Hunt will be served with notice of the suits, and the legal proceedings will probably develop an interesting fight. R. C. McCracken, Jr., is the President of the Cincinnati Telephone Company, and Robert W. Seebaum is Secretary. Philip Fitzsimmons is President of the Fitzsimmons Company, and D. J. Hauss is Secretary and Treasurer. Fitzsimmons announced recently, as stated last week, that he had formed a combine with a number of Independent telephone companies that are seeking an entrance to the city, and that their lines were ready for connection as soon as conduits can be constructed.

RAISED RATES AND MAKES A NOVEL PROPOSITION.

THE Glenn Telephone Company, operating in Johnstown and several other small towns in New York State, recently faced the problem of increasing its rates for service in the Johnstown exchange. The plant has grown very rapidly since its installation and numerous improvements have been made. The service has always been kept up-to-date, the aim of the company being to furnish a first class service. It found, however, that with these improvements and extensions and the large increase that came in the number of subscribers it was soon operating at a loss. The directors then held a meeting and decided that the only plan they could adopt was to raise the rates for service. This was accordingly done and immediately there were complaints from the subscribers. The directors wishing their patrons to be friendly towards the company, held another meeting to discuss ways and means for placating the subscribers.

The next day they inserted a notice in the newspapers to the effect that it was absolutely necessary that the company increase its rates for service, but that there was a way by which subscribers could have service at the old rate. The company offered to sell telephone instruments at $15 each, for either business or residence houses, and providing the subscriber purchased the telephone and kept it in order, the company would furnish service at the old rate. It is stated that not a single subscriber so far has purchased his own telephone, and they are all content now to pay the increased rate for service, believing the company to be acting fairly by them.

INDIANA TRUNK LINE COMPANY.

By H. S. O'Brien, *Special Correspondent*

TWENTY of the twenty-five Independent telephone companies of Northern Indiana were represented at a meeting held in Logansport, Ind., to continue the plans for through trunk lines for long distance service between points with Lafayette on the south, South Bend on the north, Winchester on the east and Chicago on the west. It was decided to incorporate the Northern Indiana Independent Telephone Company with a capital of $10,000 to start with, the stock to be subscribed by individual members of the Independent companies. The next meeting will be May 28, when a Board of Directors will be voted for.

Walter Uhl, of the Logansport Home Telephone Company, is at the head of the movement. The plan agreed upon is not a merger of Independent telephone interests but a pooling of long distance business. A clearing house will be established and eventually central offices in charge of competent men.

Among those who attended the meeting were: C. L. Haines, Wabash; E. M. Popp, Ft. Wayne; C. A. Jay, Kokomo; Henry Barnhart, Rochester; W. L. McCray, Kentland; Chas. W. Slick, Mishawaka; E. H. Griswold, Peru; Theodore Thorward, South Bend; John E. Yarling, Ft. Wayne; E. B. Walker and H. Kerlin, Delphi; Joseph Bertman, Peru; A. A. Adams, Columbia City; C. A. Reeve, Plymouth; J. C. Reckert, Buck Creek; W. L. Miller, Crawfordsville.

TELEPHONE COMPANIES HAVE RIGHTS OF TELEGRAPH COMPANIES.

A BILL has just passed both houses of the Illinois Legislature to the effect that telephone companies have the same rights as telegraph companies in setting toll lines throughout the country. The bill was introduced by Senator Evans and is now ready for the Governor's signature to make it a law. A bill was introduced originally in the interest of the Interstate Telephone and Telegraph Company, which has headquarters at Aurora, Ill. It also gives telephone companies the right to cross railroad rights of way with their pole lines under certain conditions as to elevation, size of poles, etc.

ONE OF OHIO'S SUCCESSFUL COMPANIES.

THE Mt. Vernon Telephone Company, Mount Vernon, Ohio, held its annual meeting recently. The reports of the secretary and treasurer proved most gratifying to the eighty stockholders of the company. They showed that over $19,000 had been expended during the past year for improvements and new construction.

A new exchange was installed at Canterbury having a switchboard capacity of 100 lines, of which 69 are now in use. The Fredericktown exchange of the company was rebuilt and its location changed to another building. This exchange now has 189 subscribers. The Brandon exchange of country party lines was completed and 27 subscribers are connected to it.

The company operates 1,200 telephones in Mount Vernon and Knox county. It reports a net increase during the year of 365 telephones. In addition there were added 116 new party line subscribers among the farmers. Fifty-six miles of pole lines were constructed during the year. The company paid dividends of 1½ per cent. quarterly, or 6 per cent. on the capital stock. Over 150 subscribers are on the waiting list and will be connected to the exchange in a short time.

The question of an additional stock issue for the installation of additional contracts was discussed, but final action was deferred to an adjourned meeting. The following directors were elected: Frank L. Beam, B. L. McElroy, Harry C. Devin, P. S. Kelser, E. O. Arnold, W. P. Bogardus, A. B. Sipe, B. D. Herron and H. G. Beam. The directors elected F. L. Beam, president; B. L. McElroy, vice-president; Harry C. Devin, secretary, and P. S. Kelser, treasurer.

PENNSYLVANIA RAILWAY TO HAVE A TELEPHONE SYSTEM.

THE Pennsylvania Railroad Company has commenced the construction of a private telephone system along its line from Ashtabula, Ohio, to Pittsburg, Pa. The circuit is to have exchanges at each terminal named and also in New Castle and other intermediate points.

It is expected that the entire telephone system will be completed inside of two months.

The telephone system will mean a great improvement in the handling of the Pennsylvania's business. It is now said that the B. & O. and Erie are also contemplating similar improvements.

UNION ELECTRIC TELEPHONE CONNECTIONS.

ARRANGEMENTS were made recently at a conference between Manager Slater, of the Union Electric Telephone & Telegraph Company operating in Davenport, Ia., and Moline and Rock Island, Ill., and the presidents of the Argo telephone lines, by which the Argo lines will be connected with those of the Union Electric Company. In order that this may be done, a line will have to be extended from Camp McClellan to Argo, a distance of twelve miles.

The injunction that was secured recently by the Johnson County Telephone Company for the purpose of having its lines connected with the Union Electric Company has been obeyed by the latter, and the Johnson County Company is now connected with Davenport, Moline and Rock Island. This fight gave indication of being a very long and bitter one and every one will be interested in learning that it has been settled. The matter of dispute at issue between the two companies was a contract alleged to have been drawn and signed when the Davenport franchise was owned by Bills & Wortham, who sold out to the present Union Electric Telephone & Telegraph Company, which repudiated the contract and cut the wires of the Johnson County Company out of its exchange. The Johnson County Company then secured an injunction ordering the Union Electric Company to connect its lines with the Davenport exchange. The trouble, however, has all been amicably settled, at which every one interested is rejoicing.

SYRACUSE BELL COMPANY IN TROUBLE.

A DETERMINED effort is being made by the Mayor and other city officials of Syracuse, New York, to oust the Central New York (Bell) Telephone Company from the city. It is alleged that the Bell company, through its failure to comply with the conditions under which its subway franchise was granted, has forfeited its franchise. In an interview recently, the Mayor of Syracuse said: "I believe I have the power to direct the corporation counsel to begin proceedings against this company if the common council fails to take action. I do not believe there is any doubt but that the company has violated its agreement with the city. It received its franchise for nothing, except that it was held to certain conditions. These conditions have been openly disregarded and I believe the franchise has been forfeited."

The corporation counsel has rendered an opinion that the company is violating the provisions of its franchise. The Mayor also says that the prices of the Central New York Company are fabulous and that in any event its rates will have to be reduced.

PROGRESS OF THE UTICA HOME COMPANY.

THE Utica Home Telephone Company, of Utica, New York, has issued a new directory showing that it now has over 1,800 subscribers in Utica and New Hartford. It is predicted that the 2,000 mark will be reached in a very short time. Subscribers are coming in at such a rapid rate that it is impossible to keep the directory up-to-date and the company intends to issue new lists every month.

The company operates direct metallic circuits to Ilion, Herkimer, Cooperstown, Little Falls, Paine's Hollow, New Berlin, Rome, Clinton, Waterville and several other towns in New York State. For the past two or three weeks the average number of long distance calls handled by the company has been over 300 per day. In addition to this, the company has connections with nearly every other city and town in the whole state. Lines are now being constructed to Watertown and very soon connection can be had to every village and hamlet in the great Adirondack Mountain section. It is anticipated that over 175 places in this section will be connected. In addition to this, all the towns in the Mohawk and Hudson valleys will be connected.

HEARING NORDICA SING BY TELEPHONE.

By J. H. Green, *Special Correspondent.*

THE operators at the Independent Telephone Company's exchange in Topeka, Kan., heard Mme. Nordica sing to a large crowd at the Auditorium on the night of May 13. This great singer, together with De Reszke and the Duss orchestra, were to appear only one night and the central girls decided that if they could not attend they would have the receiver of the telephone in a room to the right of where the singer would be stationed left off the hook so that they might hear as much as possible. After the program began, the girls found that they could hear very distinctly. The operators decided they wanted their friends to hear also, so they rang a number, and before Nordica had finished singing, there were, perhaps, thirty people at residences in distant parts of the city at their telephones listening to get as much of the music as possible. The orchestra was heard very distinctly, and when the singers would turn so that the voices came toward the receiver that also could be heard. The applause of the enthusiastic 4,500 people present seemed to come through the telephone as if there was a large party crowding about the receiver clapping into it.

The Editor's Page.

INDEPENDENT PROGRESS IN THE EAST.

INDEPENDENT telephony was born in the west. It has always had its greatest development in the west. The chief seat of manufacturing lies in the west. Altogether the life of the industry has been the west. This fact has blinded even some of the most practical men in the business to the things that are now doing in the east. As a result of the active missionary work carried on by THE AMERICAN TELEPHONE JOURNAL, the eyes of the eastern people are finally opened, and Independent telephone promotion is being pushed at a rate that promises soon to rival the intense activity of the middle west. An excellent illustration of the new spirit that has developed is furnished by the attached list of places in Western New York having Independent exchanges in operation.

This territory has been covered for a quarter of a century by the New York & Pennsylvania Company, the Bell licensee. The list shows the number of telephones in service to-day by this company, and the number of Independent telephones, town for town:

	Independent.	Bell.
Waverly-Sayre	805	195
Binghamton	1,500	1,100
Elmira	1,000	1,200
Corning	750	300
Watkins	115	55
Canisteo	119	52
Hornellsville	1,008	75
Andover	125	4
Wellsville	220	170
Friendship	245	50
Salamanca	400	60
Jamestown	1,630	630
Cattaraugus	120	55
Randolph	131	60
Sherman	260	1
Mayville	115	21
Brocton	275	8
Westfield	285	14
Erie	1,526	991
Olean	350	350
Cortland	856	18
Homer	179	2
Penn Yan	375	40
Auburn	650	490
Rochester	5,600	5,000
Brockport	380	25
Albion	100	400
Medina	290	300
Middleport	126	54
Lockport	600	600
Geneva	525	90
Lyons	105	6
Newark	215	18
Canandaigua	290	130
Niagara Falls	900	800
Towanda	475	316
Batavia	400	700
East Aurora	140	100
Silver Creek	140	20

This list is very incomplete and by no means shows all the towns even in Western New York where the Independents have outstripped the Bell. There are scores of minor places where the figures are even more striking. The same story will soon be to tell of Buffalo, where the Independents, though building operations are still under way, have already something like 4,000 stations working. In Eastern New York activity is only beginning, but scores of exchanges are already under way. And this in a district where the necessity for New York City connections is vitally essential.

NEBRASKA BEGE TELEPHONE COMPANY BEATEN.

THE Nebraska Telephone Company was not only defeated in its recent attack upon the Western Independent Long Distance Telephone Company, but the latter company has secured a decision in the Supreme Court of Nebraska that seriously affects the rights of its antagonist. The rights of telephone companies to occupy streets in incorporated towns will also be affected.

The circumstances that gave rise to the case occurred in Cass County. In the town of Louisville the Independent Company started to string its wires along lines at right angles to, and above, the old company's wires. The Nebraska Company applied to the District Court, claiming that the stringing of wires above its own would cause electric contact, interrupt conversation and ground its wires, and was granted an injunction restraining the Independent Company from proceeding. The Independent Company denied the complainant's allegations and alleged that the old company was occupying a right of way in the streets without legal right. The District Court held with the Independent Company and dissolved the temporary injunction. The case was taken to the Supreme Court by the old company and there the District Court's decision was affirmed.

In discussing the matter the court said that it could not assent to the claim of the Bell people that the statute, giving telephone companies the right of way for pole lines along the public roads of the State, permitted them to put up their wires in the streets and alleys of towns and villages. The usual and common understanding is that "public road" means "rural highway." The Legislature undoubtedly had in mind, when it mentioned public roads in the act, the popular distinction between public roads and streets and alleys, and used the former in the sense generally used and not in the generic sense. Had it regarded the right of way for telephone and telegraph poles on the streets and alleys of municipalities of such transcendent importance to the public, said the court, as to justify the Legislature in granting it, it is not probable that at the same time it would have clothed the municipalities with express authority to make the grant.

The court held, therefore, that the occupation by the old company of the streets and alleys of Louisville was without lawful authority, that it was such an unauthorized obstruction of the public thoroughfare as to constitute a nuisance at common law and be punishable as such.

TELEPHONES ON ENGLISH RAILWAYS.

ONE would not have imagined that the telephone was very largely used on British railways, renowned as they are for their conservatism. Mr. W. E. Langdon has just retired from the post of electrical engineer to the Midland Railway, one of the largest English railway systems. In accordance with the kindly English custom, Mr. Langdon's colleagues and staff entertained him at a farewell banquet and presented him with substantial marks of their esteem in the shape of various articles of silver plate. Mr. Langdon, in his speech of thanks, referred to the many changes and great progress in the use of electricity which had taken place during his long term of service. When he first started with the International Telegraph Company, nearly fifty years ago, the only telegraph instrument in use was the double needle, and the battery used was a sand battery. The miniature current which alone was obtainable then had become a great force of the age. It had expanded until there were telegraph instruments transmitting 300 and odd words a minute. When he joined the Midland, telephone and the electric light were unknown quantities. There were now 3,000 telephones at work on the Midland and no less than eleven generating stations for lighting and power. In 1878 the mileage of wire was 8,000; now it was 29,000. The Midland route carries the trunk telephone wires of the Post Office.

FOREIGN CURRENTS

By "The Arrester."

An interesting account is given in a recent number of the *Electrical Times* of the discussion in the Town Council of Hull of the proposed municipal telephone system. Both the discussion and the report of the "expert" show the extraordinarily narrow and antiquated ideas that govern the municipal brand of telephony among our British cousins. It may be mentioned that Hull is a thriving seaport town with a population of about 240,000. In this country such a city would be considered to offer a field for telephonic development to the extent of some 20,000 telephones. But the Hull Town Council is estimating for 2,000, and some conservative spirits manifest their understanding of the telephone question by suggesting that even that number is excessive! Whereupon the "expert"—the same Mr. A. R. Bennett who was good enough recently to contribute a paper on municipal telephony to a convention held under the direction of the Reform Club of New York City—pointed out that it would not be necessary to use all the material at once, since additions could be made as new customers come on. Which answer goes to show that however good a diplomat Mr. Bennett may be in coaxing his customers, his ideas of planning a telephone system must have been formed about twenty years ago and have undergone no change since.

Committee's Wonderful Findings

It seems that Hull has been considering municipal telephony for some time and a sub-committee of the "Telephones Committee" of the Town Council was lately sent to investigate the progress made at Tunbridge Wells and at Portsmouth. The sub-committee therefore held a post-mortem and peeped into the crib of a new-born infant, since the Tunbridge Wells municipal system died last year and that of Portsmouth has barely started working. The report stated that the circumstances at Tunbridge Wells were quite exceptional and that Portsmouth was considered a better guide, which is but common sense, as even an infant is a better guide than a corpse. The next sapient observation is that "the question of revenue is one upon which the success or failure of a municipal telephone undertaking very largely depends." Most wonderfully true, but true also of all undertakings from a bank down to a boot-black stand. This fact one would think might have been unearthed at Hull, without the trouble and expense of a journey to the other end of England. However, on the question of revenue, Mr. Bennett (the expert) was most reassuring; he was of the opinion that an average receipt of $26.25 per subscriber was necessary to make *a* system remunerative, and he estimated that that average would be reached in Hull.

Mr. Bennett's Sanguine Figures

Mr. Bennett further explained that he had estimated the same figure for Tunbridge Wells and for Portsmouth, but the estimate had not been fulfilled in either place. In Tunbridge Wells the actual average revenue per subscriber was $20.70 and in Portsmouth it was, as far as could be ascertained, $23.50. These discrepancies were due to the unexpected effect of the toll tariff. It had been found that most of the subscribers elected to take service under one or other of the two toll rates, viz., $17.50 *plus* one cent a call, or $12.50 *plus* two cents a call, the majority choosing the latter and making but few outward calls. In Hull, however, the lowering of the average should not be so marked, for two reasons. In the first place, of the 1,167 applicants for the municipal service, no fewer than 871 had chosen the flat rate for unlimited service, which for Hull had been fixed at $31.25; secondly, the others would have to pay a toll rate of $15 *plus* two cents a call with a probable minimum of $22.50. A brief calculation shows that 871 subscribers at $31.25 and 296 at $22.50 gives an average for the whole 1,167 of $29.03, well over the average revenue of $26.25 which Mr. Bennett says is necessary to make *a* system remunerative.

The Scheme in Figures

So elated was the committee with this brilliant demonstration of the prospects of municipal telephones in Hull that it quashed a minority report that drew a darker picture, and decided to proceed with the undertaking. The tenders for the equipment were accepted with the exception of a few, and a total capital expenditure of $219,330 is estimated for a system of 2,000 lines. The usual estimate of receipts and expenses is made, counting with revenue from the whole system as follows:

REVENUE.		
2,000 lines at $29.20		$58,400.00
Public telephones, etc		3,370.00
		$61,770.00
EXPENDITURES.		
Staff	$15,070.00	
Rents, rates and taxes	6,630.00	
Establishment charges, etc	3,355.00	
Repairs, etc	3,105.00	
Commission on receipts	150.00	
Post Office royalties	6,180.00	
Contingencies	1,500.00	
Interest	7,675.00	
Sinking fund	6,015.00	
Renewal fund	5,480.00	55,160.00
Surplus		$ 6,610.00

The average receipt from subscribers of $29.20 is taken on the assumption that the present proportion between unlimited service and toll service applications will hold good.

Mr. Bennett Progresses

American telephone managers having systems of about 2,000 subscribers may find it of interest to compare this ingenious estimate with their actual results. The expenses are not set forth in too much detail and some of them are not easily intelligible. "Establishment charges" may be municipal English for "general expense," or it may mean something quite different. "Repairs, etc.," may mean any old thing, maintenance, or reconstruction, or both, and in any case is modestly put at about 1½ per cent. on the capital. "Renewal fund" is presumably intended to represent what we call depreciation; if so, depreciation is magnificently provided for at the rate of about 2½ per cent. on the capital. Some things last long in Great Britain, but telephone plants must be exceptionally enduring. However, Mr. Bennett told his New York friends that depreciation need not be allowed for at all in a new telephone plant, so he has apparently made quite a step in advance in including even a modest two-and-a-half per cent. "renewal fund" in his estimate. This probably also helps to explain why Hull municipal subscribers are asked to pay $31.25 for their service, whereas Glasgow municipal subscribers pay only $26.25, Glasgow being much the larger city of the two. It was in referring to Glasgow that Mr. Bennett deprecated depreciation.

A New Cable Discovery

Several interesting items of information regarding telephone affairs occur in various parts of recent issues of the English electrical journals. At the meeting of stockholders of a well-known cable manufacturing company, Walter T. Glover & Co., Limited, the statement was made that the company had successfully completed experiments resulting in the production of a non-lead-covered paper cable. No details were given, nor any hint of the nature of the covering that has been found to be an effective substitute for lead as an envelope for dry-core cables, and the cable has apparently not yet been put on the market. A detailed description of the new cable will be awaited with interest. Apparently a non-metallic covering is hinted at, and if such an advance in the art of cable making has really been attained it will constitute a great step in practical telephone work. An efficient and durable dry-core cable with a light and flexible covering would be an enormous boon to the telephone engineer; so enormous, indeed, that one hesitates to build very strong hopes on the simple announcement made at the Glover meeting.

ELECTRICAL MEASUREMENTS—ARTICLE XII—MEASUREMENT OF ELECTRO-STATIC CAPACITY

By Arthur Vaughan Abbott.

WHILE all kinds of resistance, both in telephonic conductors and in the insulation which surrounds and maintains them in proper working condition is one of the earliest and most essential factors to be determined, electro-static capacity is of no less importance not alone in cables, but as well in aerial lines. In reality the capacity of conductors plays a more vital role in the transmission of speech than mere ohmic resistance. Nearly all of the modern forms of telephone apparatus, both for the switchboard and the substation, employ condensers for many purposes and the use of capacity in telephonic construction is rapidly increasing. The telephone engineer must, therefore, be prepared to examine and measure capacity as well as resistance.

The methods of estimating an unknown resistance by comparing it with a known quantity have been explained in detail, and the way last given of measuring resistance by direct galvanometer deflection depends solely upon this principle, for after the deflection of the galvanometer with a known resistance is obtained, it is easy to determine any unknown resistance by comparing the respective deflections. Electro-static capacity is somewhat mysterious and can only be explained by the hypothesis that electricity frequently behaves as if it were a substance, and

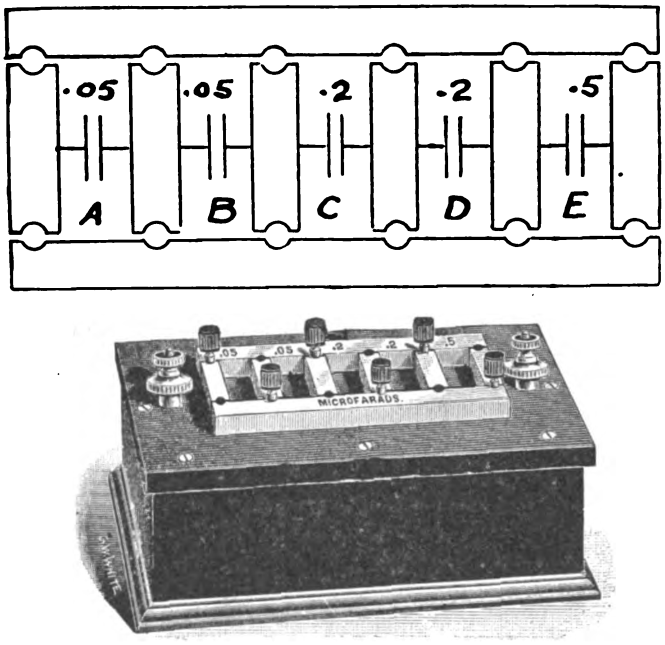


FIG. 1.—STANDARD CONDENSER.

[illegible]

experiment shows that all bodies, some to a greater degree than others, have the ability to absorb or take up a certain amount of electricity, much as a sponge absorbs water. Thus if a wire be connected to a battery the electricity does not present itself absolutely instantaneously at the remote end of the wire, but a perfectly definite, easily measurable, though very short, interval of time elapses between the application of one end of the wire to the battery and the manifestation of any electrification at the other end, and during that time a certain amount of electricity is passed into the wire; or in other words, to use a homely expression, the wire has soaked up a certain quantity of the force supplied by the battery. It is this power of absorbing electricity which is denominated "electro-static capacity."

The most familiar example of electro-static capacity is the ordinary Leyden jar. This consists of a jar or bottle of glass which is coated on the inside and outside with tin foil. Now if these coatings be connected to the opposite poles of a generator, a certain amount of electricity will be stored in the jar, which may afterwards be removed and used in any desired manner, and it is a trite experiment to take a shock by charging such a jar with a frictional electrical machine and touching the terminals.

Further investigation of this phenomenon leads us to believe that the electricity does not reside on the conducting coatings of the jar, but that it really is absorbed by the glass, which insulates one coating from the other, or in other words, the electricity does actually penetrate or soak into the dielectric which supports or surrounds the coatings. So in the case of a telephone cable, the capacity of the cable is due to the amount of electricity which soaks into the air and the paper which insulates each wire from all the others, and it is this absorption of electricity by the operation of capacity to which we attribute the injurious action which capacity exercises upon the transmission of speech.

Like all other units, the unit of capacity is called the Farad, and would be represented by a Leyden jar, large enough to hold an ampere of current, when the difference of potential between the coatings is 1 volt. Such a capacity is an enormous one, far larger than anything of which we have any knowledge, for the capacity of the Sun is less than a Farad. For common use the one-millionth of the Farad, or one micro-farad (usually abbreviated as m. f.), is taken as the unit of capacity. With this unit, telephone men are becoming somewhat familiar, for the condensers used at the subscriber's sub-station and switchboard work, and which consist of two strips of tin foil, separated one from the other by a layer of paper and insulated by paraffine, have a capacity of about two micro-farads. Now let us imagine that one of these condensers be connected to the poles of a battery and then charged, that is to say filled up with electricity. If the condenser be subsequently connected to a galvanometer, the electricity thus collected will flow out through the galvanometer and produce a momentary current. Evidently such a current will cause the needle of the galvanometer to swing. This is an experiment which can be readily tried by touching the terminals of a condenser to a storage battery or charging generator and then quickly applying them to the terminals of the galvanometer.

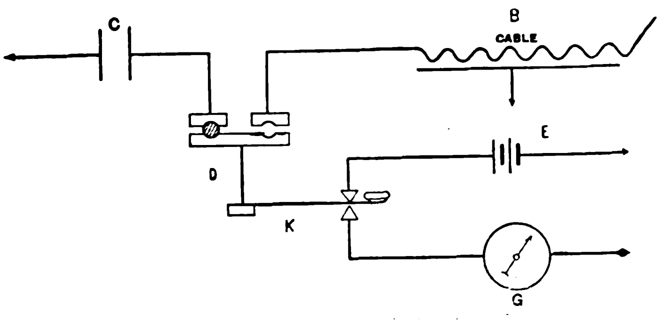


FIG. 2.

It will immediately occur to the reader that the easiest way to measure capacity is to charge a standard condenser with a battery of definite electro-motive force and then to discharge the condenser through a galvanometer and note the deflection. By this experiment the amount the galvanometer will deflect with the discharge of a known capacity is ascertained in exactly the same way as has been described for ascertaining the amount a galvanometer will deflect through a known resistance. Now if an unknown capacity be discharged through the same galvanometer, the known capacity will be to the unknown one as the first deflection is to the second.

A standard condenser in external aspect resembles a set of resistance coils. It is usually made of tin foil or other thin sheet metal carefully insulated by very thin mica. Such standards are made adjustable by packing several condensers in one box, covered with a hard rubber top, on which are heavy brass strips that connect with the various condensers. By means of plugs any desired combination between the various units can be made in exactly the same manner as in a resistance box. Fig. 1 shows such a standard in perspective, while the diagram over the top of the cut shows the circuits from which the various possible combinations can be seen by inspection. The arrangement of ap-

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Editor's Note.—The first article in this series appeared in the issue of January 17, 1903. They will continue for many months.

paratus for the measurement of capacity by desired deflections is shown in Fig. 2, in which C is a standard condenser, and B a cable or other capacity which it is desired to measure. D is a key whereby either the standard condenser C or the unknown capacity B may be *charged* by the battery E. K is a second key, whereby either capacity may at pleasure be *discharged* through the galvanometer G. The operation of testing consists in first charging the standard condenser C, discharging it through the galvanometer G and noting the deflection, then in charging the unknown capacity B and discharging it through the galvanometer. Under these circumstances relative capacity in micro-farads are directly proportional to the galvanometer deflections. If very large capacities are to be measured the galvanometer may be shunted, as has already been described for resistance measurements, and in such cases the galvanometer readings must be multiplied by the shunt factor to get the true results. In testing for capacity there is one precaution to be observed. The discharge of the condenser occupies but an infinitesimal portion of time, and therefore in order to get reliable results, the needle system of the galvanometer must be constructed in a peculiar manner. If an ordinary galvanometer is used, the fan or other method of damping or checking the oscillation of the needle must be removed, or else the condenser discharge cannot affect the needle in a proper manner. A certain type of galvanometer is constructed, termed a *Ballistic* galvanometer, that is specially adapted for this purpose. The needle system consists of a small and heavy magnet, and no means of checking its swings is provided. The needle is so heavy that the condenser is able to discharge itself through the galvanometer coils, before the needle can commence to move, and in such a galvanometer the condenser discharge operates as a push upon a pendulum, that simply sets it swinging. If the deflections of the standard condenser and that of the unknown capacity be very nearly the same, it is unnecessary to apply any corrections, and in such a case any form of galvanometer damped or undamped may be used. Should there be a wide difference in deflections, and should it be impracticable to remove the damping mechanism, a correction may be made from which essentially the true readings can be obtained. This correction is obtained by observing the first swing of the needle to the right, giving a deflection d^1, then the second swing to the right giving a second deflection d^2, the true deflection then is obtained from the equation

$$d = d^1 + d^1 - \frac{d^2}{4}$$

If the theory that capacity is due to an absorption of electricity by the dielectric be correct, it would seem that the longer a condenser was connected to the source of electricity, the more it would be able to hold, and to a limited extent this is found to be true. So if a condenser be charged for a very short period of time and discharged, and then charged again for a longer time, it will seemingly show a *larger* capacity. To avoid this source of error it is usual to charge the standard condenser and the unknown capacity to be measured for the *same length of time.* Usually in testing, the time of one minute is allowed for this purpose, but in the case of very long rubber submarine cables, a much greater charging duration is necessary. It must not be inferred from this that a condenser goes on indefinitely drinking in electricity, for after the first few seconds the increase in absorption is very slow and soon to all intents entirely ceases.

The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

DAMAGES FOR DEATH FROM FALLING POLE.

THE Supreme Court of Michigan has sustained a verdict of $5,000 given against the Valley Telephone Company for damages for the death of Roderick Kyes. The deceased was a general foreman on the work of paving Saginaw street in the city of Flint. The defendant had been notified to remove its telephone poles from the street and was engaged on that work. The wires had been removed. Kyes was filling a sewer trench near a pole upon which the telephone company's men were working. Two men who were walking along the street saw the danger, and remarked that they "wouldn't work there a minute." There was no evidence that Kyes heard the remark. He continued at his task. The guy wire was cut from the pole; it fell and crushed Kyes so badly that he died the next day. Suit was brought by his wife as administratrix.

The defendant contended that there was no evidence of negligence on the part of the defendant, and insisted that deceased was guilty of contributory negligence. The court held that "the fact that he knew that the telephone wires were being cut and removed, and that some of them had fallen near where he was at work, was not sufficient notice to him that the pole would fall. He had a right to act upon the belief that when the defendant's employees were ready to take down the pole they would notify him, if there was any danger, or would adopt safe means to take it down."

On the question of damages the telephone company contended that, in addition to compensation for pain, suffering and medical attendance, recovery could be had for only what deceased might have earned between the time of his injury and his death. The court did not allow this contention, but held that the administratrix could recover the same damages that the deceased would have been entitled to had he brought the action in his lifetime.—*Kyes v. Valley Telephone Company,* 93 *N. W.* 623.

FURTHER TESTIMONY IN TELEPHONE CASES.

THE noted case of J. F. Manning & Company against the Chesapeake & Potomac Telephone Company was taken up again early this month in Equity Court No. 2, of the District of Columbia, and an order for the taking of further testimony was made. The case, which had reference to the adjustment of rates under the act of Congress of June 30, of 1898, was reported compromised soon after the action of the Supreme Court in the matter. The compromise was conditioned upon the repeal by Congress of the act in question, and the act not being repealed, the suit is still pending.

This law provided that the company furnish unlimited telephone service at the maximum rate of $50 per month. The defendant, however, refused to comply with it on the ground that it amounted to practical confiscation of property. The present suit followed and has been fought out in both the Court of Appeals and the United States Supreme Court. The latter court sent the case down to determine the questions as to what classes of telephones, telephone equipment, and telephone service were intended to be covered by the act. At the time the suit was begun, the plaintiff was a subscriber for a metallic system for which it paid $145 per year in quarterly payments. Its contention is that the act in question was meant to apply to both metallic and underground systems.

Patents

LINE INSULATOR.

Joseph R. Bell, of Peckville, Pennsylvania, patents (No. 726,846) an improved line insulator. The object of this invention is to provide a line insulator which shall support the line wire without the necessity of tying it with an additional piece of wire.

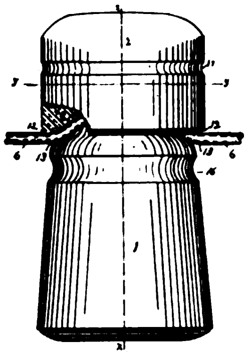

FIG 1

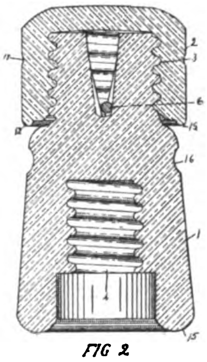

FIG 2

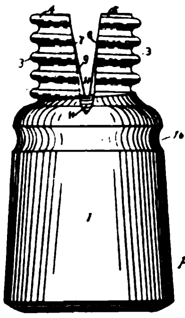

FIG 3

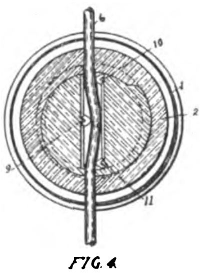

FIG 4

The device is shown in Figs. 1 to 4 inclusive and consists in furnishing the top of the insulator with a projection 3. This projection is threaded and supplied with a cap 2 which fits the screw thread and secures the wire in place.

IMPROVEMENT IN HOLDING TELEPHONE DIAPHRAGMS.

William L. Denio, Rochester, N. Y. patents (No. 728,162), and assigns one-half to Hobart F. Atkinson, Rochester, N. Y., a device for holding telephone diaphragms. The object of this invention is to provide a better method for securing the diaphragms in telephone apparatus. As shown in Figs. 5 and 6, the inventor provides a corrugated washer, Fig. 6, which is intended to surround the edge of the diaphragm. This washer is placed between the diaphragm and the receiver case and the cap screwed down in place. By means of the corrugations in the washer, the diaphragm is firmly clamped at a few points, and thus it is claimed more securely and more efficiently held.

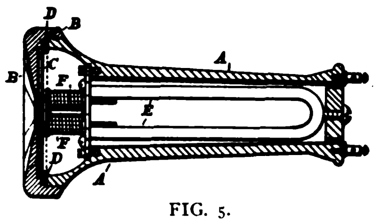

FIG. 5.

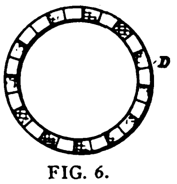

FIG. 6.

SELECTIVE SIGNALING APPARATUS FOR PARTY LINES.

Fred. E. Green, Newburyport, Mass., patents (No. 728,165), and assigns forty-nine one-hundredths to H. Russell Perkins, a selective signaling device for party lines. This is a patent for a selective signaling apparatus, as shown in Figs. 9 and 10. It belongs to the class of step-by-step devices. The inventor provides a sliding toothed bar 2 which is actuated by the line current sent over a magnet 48. Each impulse of the line moves the bar along one notch. This sliding piece carries a dog 10, which is arranged to close a contact 9 that normally keeps the circuit leading to the bell *B* from the battery 15 open. A tripping magnet 13 is arranged to release pawl 30 and allow the bar 2 to slide back to its normal position as soon as it reaches the end of its stroke; but in order that the bell may have sufficient time to ring, a pneumatic buffer 12ª is supplied, which prevents the bar 2 from sliding back rapidly and gives the operator sufficient time to ring the bell before this bar returns to its normal position and opens the contact 10.

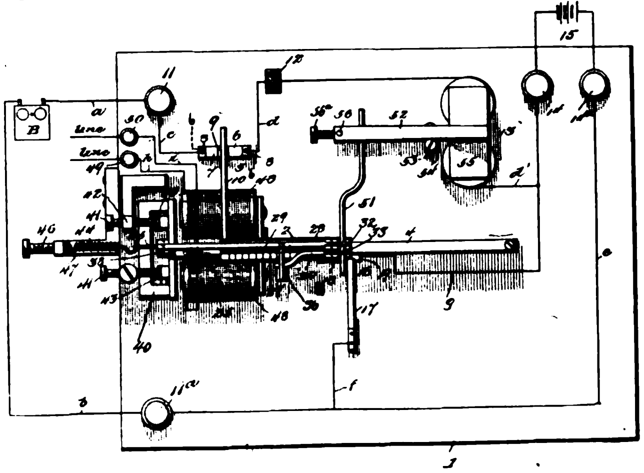

FIG. 9.

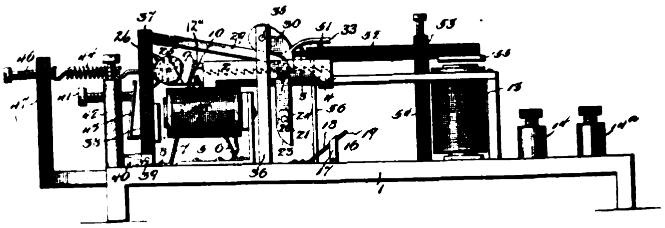

FIG. 10.

IMPROVEMENT IN SECURING TELEPHONE DIAPHRAGMS.

M. R. Hutchison, New York, patents (No. 727,634), and assigned by mesne assignment to the Hutchison Acoustic Company, an improvement in securing the Diaphragms of Telephone Apparatus. This device is shown in Figs. 7 and 8, in which *B* is the diaphragm that is surrounded by soft rubber washer *d*. At several places, along the periphery of the diaphragm special metallic bands *c* are curled around the rubber washer to be secured between the cap *a* and the frame work of the receiver or transmitter *A*. By this means good electrical contact with the diaphragm is obtained.

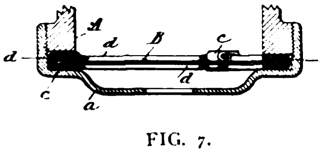

FIG. 7.

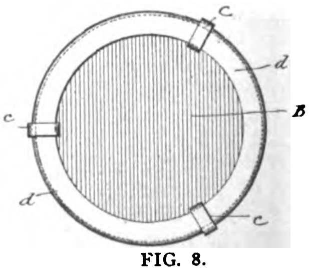

FIG. 8.

SELECTIVE SIGNALLING SYSTEM.

Charles B. Smith, New York, N. Y., patents (Nos. 727,702, 727,703 and 727,704) a method of selectively signalling party lines. In its simplest form this invention is shown in Fig. 12. At the central office a grounded battery 7 is supplied, also a set of keys *b* to d^2 inclusive. The stations are grouped in sections of three upon a signalling wire. Thus, for example, stations *B* B^1 B^2 are placed upon wire 1^c. The second set of stations *C* C^1 C^2 are placed upon wire 1^b, while the third set *B* B^1 B^2 are placed upon wire *1*. In the circuit of each station a relay is connected to a common signalling wire, as for example, stations *D* D^1 and D^2, the relay of station *D* is connected between wire c^1 and wire *4*, while D^2 is connected between wire c^1 and wire *5*. When any one of the keys, *b* to b^2 inclusive, are pressed, the relay corresponding to the key selected is excited, the local circuit at the station closed and its bell rung.

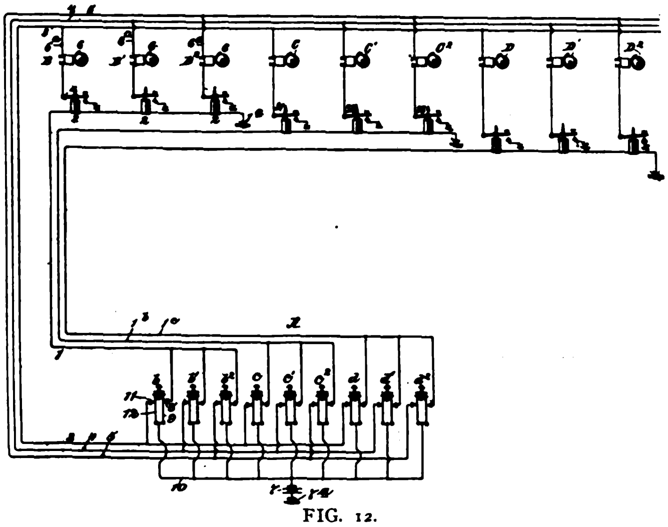

FIG. 12.

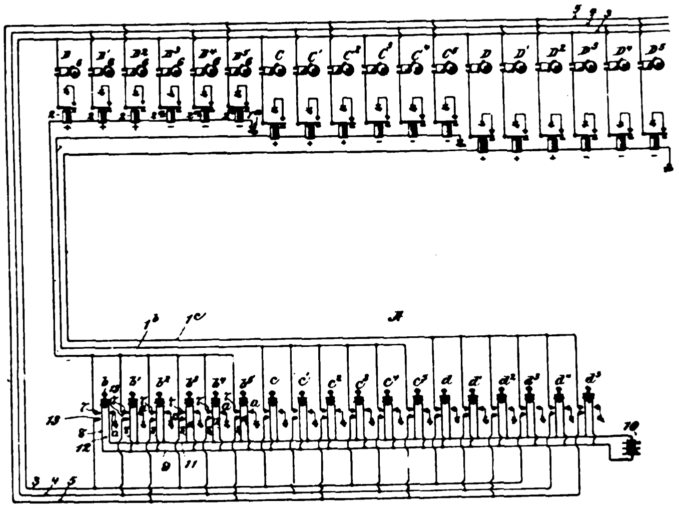

FIG. 13.

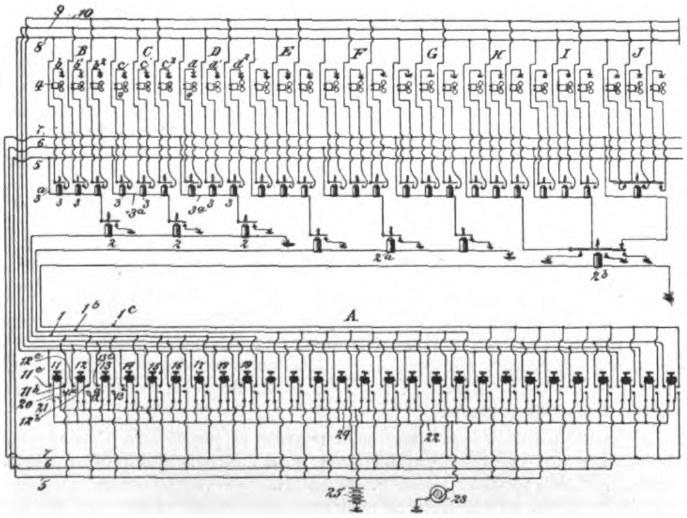

FIG. 14.

Patent No. 727,703, shown in Fig. 13, is merely an extension of the system described in No. 727,702. In No. 727,703 the system is developed to be made selective for six stations by substituting polarized relays for the ordinary relay described in the previous patent, and by this means any one of the six stations instead of one or three stations may be selectively signalled.

In Patent No. 727,704, the same system is again amplified by the addition of a second relay. The circuits shown in Fig. 14 are self-explanatory when taken in connection with the description already given. It is obvious that by providing successive relays this system could be carried to almost any extent.

LINE SYSTEM.

Wm. E. Pembleton, of Wittenberg, Wis., patents (No. 726,984) an improvement in party line circuits. The object of this invention is to provide secrecy in party line sub-stations and to prevent both subscribers and operators from listening in. This invention is shown in Fig. 11. When the receiver is taken off the hook, lever *C* closes the contacts *c d* and the contact *d* is lifted away from the contact *e*. If the line is in use current will flow from conductor *B* to electro-magnet *N*, contact lever *d*, lever arm *b*, contact *c* to conductor *A*. The armature of the magnet *N* is attracted, lifts the lever *O*, closes contact *j* with point *k* that completes the circuit of the electro-magnet *P*, battery *K*, transmitter *L*, induction coil *M*, the armature of the electro-magnet *P* being attached to the lever *Q* through a catch underneath the telephone hook *C* and prevents it from closing the contacts i, i^1 i^2. As these contacts include the receiver and the transmitter the line cannot be used. If contact *N* is closed to contact *d* the armature of the electro-magnet *N* will be attracted so that one can ascertain if the line is busy by mechanically closing this contact and noticing any signal attached to this armature. The rest of the circuits in this patent are almost self-evident.

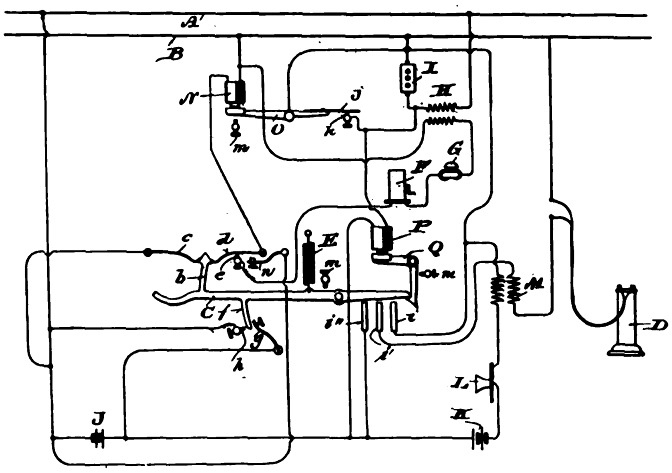

FIG. 11.

IMPROVEMENT IN TELEPHONE CALL BELLS.

George K. Jackson, of Reece, Kansas, patents (No. 727,801) an improvement in telephone call bells. The object of this device is to provide a means whereby a subscriber who happens to be absent from his telephone station can be notified that a call has been received, on his return. This device is shown in Fig. 11. On one of the bells a swinging lever 3 is loosely pivoted. In normal condition the lever is shown by the full lines and is retained in horizontal position by so arranging it that the point 7 is in contact with the bell clapper 5. As soon as ringing current is sent over the line the clapper 5 moves, releasing the lever which by gravity falls to the position shown by the dotted lines and thus indicates that a call is received.

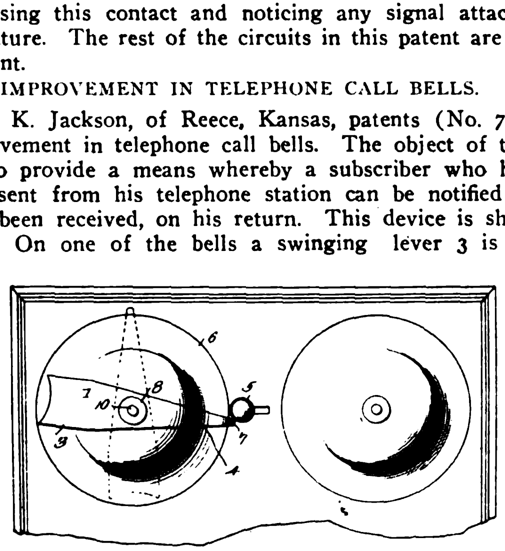

FIG. 15.

The Week's Messages.

FINANCIAL.

RICHMOND, IND.—The Richmond Home Telephone Company has issued $25,000 in bonds to secure money to increase the capacity of the plant. Nearly 2,000 telephones are in use, but there is demand for another 1,000. The bonds were promptly taken by local investors.

WARSAW, IND.—The Commercial Telephone Company, of Warsaw, has increased its capital stock from $30,000 to $50,000.

IDA GROVE, IOWA.—I. N. Shearer and C. P. Fredendoll, of Ida Grove, and M. M. White, W. J. Cizek, J. D. Greve and F. C. McCutchen, of Holstein, Iowa, were at Wahoo, Neb., attending the annual meeting of the Golden Rod Telephone Company, the stock of which is owned by Ida county people. In view of the growth and prospective needs of the company, its capital stock was increased from $50,000 to $100,000.

LA PORTE CITY, IOWA.—The Jones County Telephone Company has increased its capital from $50,000 to $100,000.

LENORA, MINN.—The Stevens County Telephone Company has increased its capital stock from $10,000 to $15,000.

FAYETTE, MO.—There will be a meeting of the stockholders of the Howard County Telephone Company the 23d of May to vote on the increase of its capital fund, $10,000, to $24,000.

LITTLE FALLS, N. Y.—The insurance on the Inter-State telephone office has been adjusted. The total insurance on the switchboard and furniture was $6,000—$4,000 on switchboard and $2,000 on furniture. The loss on the switchboard was adjusted as total. The loss on the furniture was adjusted at $1,504.

PITTSBURG, PA.—The Pittsburg and Allegheny Telephone Company will increase its capital stock from $1,500,000 to $4,000,000. The additional money received from the increase in capital will be devoted to building new lines in the city, and also to connect Pittsburg with other large cities of the east and west.

WALWORTH, WIS.—The Walworth Telephone Exchange Company has increased its capital stock from $1,200 to $2,200.

FRANCHISES.

SANTA BARBARA, CAL.—The board of supervisors have granted a 50-year franchise to the United States Long-Distance Telephone Company, the stockholders of which are the same as those of the Home Telephone Company, of Los Angeles.

CORONA, CAL.—The city trustees have received an application from Henry A. Coit, of St. Louis, Mo., for a fifty-year franchise for overhead or underground telephone or telegraph systems.

SANTA MONICA, CAL.—A form of notice of sale of a telephone franchise was presented to the city trustees by W. L. Porterfield. Mr. Porterfield said that if granted the franchise he would install a $35,000 plant in Santa Monica.

McCOMB, ILL.—The committee appointed by the Farmers' telephone lines to confer with the city council relative to the ordinance for a farmers' exchange in this city has accepted the ordinance as granted by the city council recently to the local telephone company.

MAROA, ILL.—J. M. Jeffrey has a petition before Maroa city council asking a franchise for a telephone line into that city. Mr. Jeffrey has been placing a number of telephones in Texas and Creek townships lately and now wants to enter Maroa.

EVANSVILLE, IND.—The city council by a unanimous vote has passed the municipal telephone franchise. The company has almost $200,000 subscribed, and work on the plant will commence in a few days. The franchise of the Cumberland Telephone Company expired last July, and it is contended by the city that the company is now operating without a franchise. The case has been in the federal court for the last six months.

COUNCIL BLUFFS, IOWA.—The city council has decided that the question of granting to the Western Iowa Independent Telephone, Telegraph and Terminal Company a franchise to operate in the city be submitted to the people at a special election to be held June 8.

SALIX, IOWA.—At the local election the proposition to grant a telephone franchise to the Onawa Telephone Company was carried by five majority, 69 votes being cast.

WELLINGTON, KAN.—The Farmers' Mutual Telephone Company, of Rome, has asked the city council for a local franchise.

AUSTIN, MINN.—The city council has granted a franchise to the Inter-State Telegraph and Telephone Company of Austin.

ST. PAUL, MINN.—The Twin City Telephone Company has secured a franchise from the city of Grand Forks and will extend its line to that city.

STILLWATER, MINN.—An ordinance has been adopted by the city council granting the Consolidated Telegraph and Telephone Company the right to erect poles and maintain long-distance telephone lines in this city.

LA GRANGE, MO.—The Wyaconda Telephone Company has been granted a franchise to run its lines into La Grange for ten years by the city council.

GLASGOW, MONT.—The city council has granted to H. D. Low, of Williston, N. Dak., a ten-year franchise, which gives him the exclusive right to operate a telephone system in Glasgow provided he accepts the franchise within thirty days and completes the system before the expiration of six months.

MIAMI, OHIO.—Manager J. F. Haverstick, of the Miami Telephone Company, was at Yellow Springs recently and was granted a franchise.

HITCHCOCK, S. DAK.—The Dakota Central Telephone Company has received permission to build a line through Hitchcock.

COMBINATIONS.

LAWRENCEBURG, IND.—The People's Telephone Association of Indiana has purchased the line of the Dearborn County Telephone Company.

ONAWA, IOWA.—The Onawa and Monona County Telephone companies have consolidated.

BEDFORD, PA.—The Bedford-Fulton Telephone Company has bought the plant of the Bedford Telephone Company at Everett, Bedford county, Pa. This deal gives the Bedford-Fulton Company a joint interest in the line running from Everett to Bedford and control of the exchange at Everett. An effort will be made to get connection with Pittsburg and Philadelphia.

RUTLAND, VT.—The Rutland County Telephone Company has taken possession of the system just completed, which embraces the towns of Wallingford, Tinmouth, Danby, Ira, Middletown Springs, Wells, Pawlet and Rupert.

CLARKSBURG, W. VA.—The Consolidated Telephone Company has bought the Farmington telephone exchange and all the lines belonging to the Farmington company.

ELECTIONS.

FREEPORT, ILL.—At a recent meeting of the stockholders of the new Stephenson County Telephone Company the following officers were elected: President, C. D. Knowlton; vice-president, W. A. Hance; treasurer, Ezra Morse; secretary and manager, L. A. Herrick; directors, Dr. J. H. Firestone, Dr. D. C. L. Mease, F. L. Bills, T. K. Best, W. A. Hance, C. D. Knowlton and Ezra Morse.

PRINCETON, ILL.—At the annual meeting of the Bureau County Telephone Company the following directors were elected: Frank Morrasy, of Gold; P. P. Michaels, of Ohio; S. R. Spratt, of Wyanet, and Alfred Norris, of LaMoille. The directors re-elected all the old officers for another year. They are as follows: President, Dr. A. E. Owens; secretary, C. O. White; treasurer, A. H. Ferris; general manager, C. O. White; accountant, S. S. Harris.

JEFFERSON, IOWA.—The annual meeting of the Greene County Telephone Company was held in this city recently. The old board of directors

THE WEEK'S MESSAGES—Continued.

was re-elected, and the following new directors were added: George P. McBurney, John Walton, D. E. Brown and G. S. Turrill. The directors elected: Mahlon Head, president; J. M. Forbes, vice-president; M. M. Head, treasurer; Purl C. Cockerill, secretary and manager; E. B. Wilson, attorney; Mahlon Head, E. B. Wilson, G. S. Turrill, M. M. Head, Purl C. Cockerill, executive committee.

SMITH CENTER, KAN.—The new stockholders have assumed control of the Exchange Telephone Company and elected the following officers: W. H. Nelson, president; R. M. Pickler, vice-president; Arthur Nelson, secretary; F. W. Mahin, treasurer.

OAKLAND, MD.—The stockholders of the new West Virginia & Maryland Telephone Company met at Friendsville and elected the following officers: President, C. C. Frankhauser; vice-president, C. V. Guard; secretary, Ross Frazee; treasurer, W. H. H. Friend. The following were elected directors: Taylor Friend, W. D. Arthur, C. W. Friend, Harvey Speicher, T. O. Collier, J. A. Beachy, H. R. Dewitt, John Sines and D. E. Offutt.

CAMBRIDGE, MICH.—At the annual meeting of the Cambridge & Woodstock Telephone Company all the old officers were re-elected and are as follows: President, George Ebbert; vice-president, S. Alderdyce; secretary-treasurer, Clarence Neely; board of managers, Marion Morgan, Stephen Drake and Albert Eggleston.

RED LODGE, MONT.—A meeting of the stockholders of the Red Lodge & Wyoming Telephone Company was held in the office of Attorney George W. Pierson recently. A number of the old officers having disposed of their stock in the company the following new directors were chosen: L. L. Moffett, of Billings; George W. Pierson, Frank A. Sell, Hon. J. N. Tolman and S. D. Metier. The directors then met and elected officers, as follows: President, Mr. Moffett; vice-president, Mr. Sell; secretary and treasurer, R. L. Davis.

WAKEFIELD, N. H.—At the annual meeting of the Wakefield Telephone Company officers for the ensuing year were chosen as follows: President, James W. Garvin; treasurer, John H. Garvin; clerk, Arthur L. Foote; J. W. Garvin, R. W. Dow, P. T. Haskell, directors.

SUSSEX, N. J.—The Farmers' Union Telephone Company, of Sussex, has elected these directors for the ensuing year: Warren D. Haggerty, Gabriel Ludlam, Charles J. Stanaback, Frank Armstrong, Charles J. Coykendall, Joseph Ayers, Raymond Coursen, J. Irving Brink and William Ayers.

COHOES, N. Y.—At a meeting of the directors of the Cohoes & Waterford Home Telephone Company the following directors were elected: John Clute, George H. Fitts, James H. Shine, Thomas Breslin, Howard Hendricks, Frank H. Foudro, James H. Griswold, of Elyria, O. The officers elected are: President, James H. Shine; vice-president, J. H. Griswold; secretary and treasurer, Frank A. Foudro.

LOYALSOCK, PA.—The stockholders of the Montoursville, Loyalsockville and Warrensville Telephone Company held a meeting at Loyalsockville recently and completed the organization. The following officers were elected: President, Reuben H. Rothfus; vice-president, J. C. Budd; secretary, Dr. R. H. Milnor.

COVENTRY, R. I.—The incorporators of the Coventry Telephone Company met for organization at Summit and elected directors as follows: Job S. Carpenter, James H. Hill, Israel Whaley, Byron H. Nixon and Frank G. Bates. By-laws were then adopted and the board of directors met subsequently and elected the following officers: President, James H. Hill; treasurer, Israel Whaley; secretary, Frank G. Bates.

JACKSON, TENN.—At a recent meeting of the Jackson Home Telephone Company of Jackson, Tenn., the following officers were elected: A. D. Hay, president; William Drury, vice-president; Dr. A. C. Shoemaker, treasurer; Joseph D. Lloyd, secretary; F. C. Johnson, Robert T. Pettebone, E. R. Pettebone, C. E. Brobst, John E. Nugent, Frank P. Hooper and Joseph L. Dunn.

HARRISONBURG, VA.—At the annual meeting of the Rockingham Mutual Telephone Company Dr. C. H. Rolston, of Mt. Clinton, was elected president, D. B. Showalter vice-president, and J. A. Wenger secretary and treasurer.

NEWPORT NEWS, VA.—At a meeting of the stockholders and directors of the Citizens' Telephone and Telegraph Company W. Scott was elected president, A. S. Patrick, of Staunton, vice-president; N. C. Watts, Staunton, treasurer and general manager; J. B. Shaw, superintendent; S. B. Batte, manager; C. A. Galley, secretary.

PERSONAL.

OSWEGO, N. Y.—William B. Van Wormer, manager of the Ontario Telephone Company, has resigned his position and about June 1 will leave for Cleburne, Texas, where he will take charge of the new Independent telephone company. Mr. Van Wormer's successor has not yet been named.

SUNBURY, PA.—G. B. Wright, superintendent of the United Telephone and Telegraph Company for this district, has accepted the position of general superintendent for the York State Telephone Company, with headquarters at Binghamton, N. Y. H. N. Daniels will succeed Mr. Wright at Sunbury.

UNDERGROUND.

ADRIAN, MICH.—The Citizens' Telephone Company is preparing to place new cables through the conduits of the paved district.

GETTYSBURG, PA.—C. L. Bare, manager of the United Telephone Company, is here to obtain a franchise from the borough authorities to lay underground wires.

LITTLESTOWN, PA.—C. L. Bare, manager of the United Telephone and Telegraph Company, of Philadelphia, has been here to secure a franchise to lay underground wires.

MISCELLANEOUS.

FREDONIA, KAS.—The Fredonia-New Albany telephone line has been completed. Chas. E. Hall, A. P. Skaggs, J. T. Cooper, J. F. Hollis and Isaac Hudson are the owners.

BOSTON, MASS.—The American Telegraph & Telephone Company instrument statement for month ended April 30 and since Dec. 20 compares with previous years as follows:

	1903.	1902.	1901.
Gross output	104,429	108,242	72,396
Returned	43,491	37,587	33,177
Net output	60,938	70,655	39,219
Since Dec. 20:			
Gross output	410,390	387,795	288,505
Returned	160,137	152,085	122,604
Net output	250,253	235,710	165,901
Total outstanding	3,400,573	2,761,720	2,118,717

New Construction in the Field

GAINESVILLE, GA.—The Standard Telephone Company, of Atlanta, may soon take steps to install a system in Gainesville.

SAVANNAH, GA.—The Georgia Telephone and Telegraph Company has completed its long distance line to Statesboro. It is the purpose of the Georgia Telephone and Telegraph Company to continue its service northward, though it is not yet ready to give out details as to its route or the next important station to be established.

STERLING, ILL.—The Interstate Telephone Company is constructing a toll line from this city to Deer Grove.

TISHOMINGO, I. T.—Manager W. H. Thorpe, of the Tishomingo Telephone Company, says his company will at once extend its line from Madill to Denison, and will also build a line along the line of the Arkansas and Choctaw Railroad.

DEDHAM, IA.—The Dedham Telephone Company is installing a local system. John Raygor is the contractor.

FORMOSO, KAS.—The Jewell County Telephone Company will erect a line from Formoso to the Omio coal mine.

KANSAS CITY, KAS.—The Home Telephone Company will shortly begin work on its conduit system, material for which is on the ground, preparatory to stringing its wires. Under its franchise its lines must be completed and ready for business by November 1st.

STERLING, KAS.—A new telephone line to Little River will be constructed by the Sterling Independent Company.

WESTBROOKE, ME.—The Westbrook Telephone Company is placing poles about the city getting ready for the opening of the exchange, which has at the present time over one hundred subscribers. The company has leased the offices and will shortly be in operation.

BALTIMORE, MD.—The Maryland Telephone and Telegraph Company has established an exchange in Reisterstown.

ALPENA, MICH.—W. W. Jones, of Toledo, president of the North-

THE WEEK'S MESSAGES—Concluded

eastern Telephone and Telegraph Company; G. E. Dutton, of Saginaw, secretary and treasurer of the company, and H. F. Barbour, of East Tawas, one of the directors, were in the city recently arranging to extend the long distance line to Cheboygan.

DETROIT, MICH.—President Burton, of the Co-operative Telephone Company, says that the new exchange will be ready for local and long distance service soon. It is also stated that the last of the poles of the company between Detroit and Plymouth are set, and all the wires will soon be strung. The service in Detroit will start with about 300 telephones.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company proposes to extend its lines in Wexford and vicinity this summer as follows: From Cadillac to Dighton, via Tuston; Cadillac to Harrietta, via Boon, and Cadillac to Elton.

HOWELL, MICH.—The Livingston Home Telephone Company is unloading poles at South Lyon and Plymouth, preparatory to extending its toll lines to the latter place.

MENOMINEE, MICH.—It is stated that the American Electric Telephone company will build exchanges in this city and Marinette within the next year. A franchise will be asked for soon.

LUVERNE, MINN.—The Enterprise Telephone Company is erecting a new building to serve as a central office for its new exchange.

MEMPHIS, MO.—The Scotland County Telephone Co. held a meeting at the court house recently for the purpose of hearing the report of the committee appointed at last meeting to find out the probable cost of a switchboard and also to ascertain what it would cost to run the lines into Memphis. The committee's report was adopted and the committee authorized to purchase a switchboard and the equipment necessary.

WHITE SULPHUR SPRINGS, MONT.—E. G. Hartfield, manager of the Castle Mountain Telephone Company is preparing to install a local telephone exchange.

ANGELICA, N. Y.—The Angelica telephone line is soon to be extended to West Almond and Jersey Hill.

GLOVERSVILLE, N. Y.—It is said that in a short time the office of the Glen Telephone Company in Fultonville will be united with the Fonda office. The Glen Company has a large number of telephones to install in that village, but no additions can be made until more cables are connected with the switchboard.

MARLBORO, N. Y.—The Home Telephone Company, of Marlboro, expects to make connection with the Colonial system of Newburgh and the Poughkeepsie system.

MIDDLETOWN, N. Y.—The Orange County Telephone Company has completed the construction of its trunk line to Pine Bush and is setting poles and stringing the wires on the Goshen line. Connection will be made with the Highland Telephone Co., which has an office in Goshen. They will open communication with the Orange County Telephone Co., with Goshen, Chester, Greycourt and Oxford Depot. A Newburgh connection will be made with the Colonial Telephone Company, over whose lines communication can be had with Poughkeepsie, Kingston and Cornwall. By means of the Highland Company's line the Orange County will also connect with the Farmers' Telephone Company, giving communication with Sussex, Newton and other places in New Jersey and Pennsylvania, and to Port Jervis. Also with the Warwick Valley Telephone Company, giving connection with all points on its line. Within the next two weeks connection will be made direct with the Farmers' Telephone Company at Slate Hill. The Orange Company will also build a line to Otisville.

POUGHKEEPSIE, N. Y.—The new Duchess County Telephone Co. has connections with Port Jervis, Warwick, Stillwell, Peters Valley, Milford, Delaware, Egypt Mills, Silver Lake and all towns in Southwestern New York; thence to Newton, Sussex, N. J., and thirty-three exchanges in Northern New Jersey; also to Stroudsburg, Pa., and all their connecting exchanges, including Delaware Water Gap. The company expects to connect to the entire west before long, as the work of building is progressing rapidly in almost every city and town in the county.

POMEROY, OHIO.—The Home Telephone Company is constructing a trunk line from Coolville to Pomeroy.

OKLAHOMA CITY, O. T.—The management of the Pioneer Telephone Company received an additional switchboard to be used in order that they may supply the demand for their telephones.

HAZELTON, PA.—The citizens of Nuremberg have petitioned the Anthracite Telephone Company to extend a branch line to that place.

MEYERSDALE, PA.—A. F. John of the Somerset County Telephone Company was here recently. It will require several months to complete the improvements begun here, owing to the inability to get material. The line will be extended to Confluence the coming season.

BRIDGEWATER, S. D.—The Bridgewater and Union Telephone Company has received necessary material and will at once begin the construction of a rural line extending twelve miles south of town, reaching into the heart of the Russian settlement. From the main line branches will be run off at intervals of every few miles.

MEMPHIS, TENN.—The Memphis Long Distance Telephone Company already has its extensions from Memphis under way, and is vigorously pushing them. The trunk line from Memphis to Jackson is completed to a point about sixteen miles from Memphis.

BEAUMONT, TEXAS.—The Beaumont and Northwestern Telephone Company will extend its lines through the counties of Jefferson, Liberty, Hardin, Orange, Chambers, Jasper, Tyler, Newton, Sabine, San Augustine, Nacogdoches, Harris, Montgomery, San Jacinto, Angelina, Shelby, Panola, Harrison, Marion, Upshur, Camp, Titus, Franklin, Cass, Bowie, Red River and Lamar.

SALT LAKE CITY, UTAH.—The city council has sold the old city hall corner lot to the Utah Independent Telephone Company for the sum of $48,000. The officials of the telephone company state that plans are being prepared for the construction on the lot of a modern three-story, fire-proof, brick and stone building to be occupied by an up-to-date telephone system. The cost of equipments and construction will be in the neighborhood of $100,000.

BRISTOL, VT.—The lines of the Addison County Telephone Company are being thoroughly overhauled.

GLENWOOD, WIS.—The West Wisconsin Company, with headquarters at Glenwood, recently incorporated with a capital of $5,000, has its new lines to Boyceville about completed and expects to begin service next week. Work will then be pushed on an eight-mile extension through a farming country to Connersville. It is the intention later in the summer to build from Emerald to New Richmond or Hudson, and at one of those places make connections with the Twin City Independent company.

TRADE NOTES

C. H. Worcester Company has announced the establishment of a new Chicago office at Suite 1,206, Tribune building. For some time, this company's business has been growing so rapidly that the management felt the need of an office centrally located. The company is now prepared to fill orders for white cedar poles and other cedar products through its Chicago office.

The Monarch Telephone Manufacturing Company has moved into its handsome and commodious new building at 12 and 14 South Clinton street, Chicago. The company will have the very best facilities here for turning out high grade telephone apparatus, and its enlarged office facilities will enable the prompt attention to all business communications.

The Vought-Berger Company, La Crosse, Wis., has received many orders of late. Among recent visitors to its plant at La Crosse, were F. E. Davidson, president, and A. C. Miller, secretary, of the Redwood County Rural Telephone Co., Redwood Falls, Minn., who left an order for one hundred bridging telephones and a number of series instruments and pendent telephones and an addition for the Morgan switchboard; Rev. J. C. Siegler, of Nodine, Minn., who ordered a switchboard and fifty bridging telephones for the new farmers' lines centering at Nodine; L. G. Saxvik, of Highlandville, Iowa, who ordered a switchboard; D. P. Walter, of Luana, Iowa, who gave an order for a switchboard at Postville, Iowa; A. A. Peterson, manager of the Steele County Telephone Co., who bought a toll board for Blooming Prairie, Minn.; G. W. Morgan, of Reedsburg, Wis., who ordered a switchboard for La Valle; Leo Pottratz, of Eitzen, Minn., who left an order for twenty-five bridging telephones; also Mr. Brooks, of the Twin City Telephone Company, and the Consolidated Telephone & Telegraph Company.

Among other switchboards and equipments recently sold are a 200-drop board for the Grantsburg exchange of the Consolidated Telephone & Telegraph Co., of Minneapolis; an addition for the Le Sueur board at Le Sueur, Minn.; farmers' line from Decoria to Good Thunder, and also in Apple Creek, Ohio, and Colorado, Texas; Shiocton, Wis.; Holliday, Mo.; Madison, Mo.; New Hartford, Mo.; Spring Grove, Minn.; Tomahawk, Wis.; Jasper, Mo.; Keystone, Iowa; Goss, Mo.; Somers, Iowa; Clutier, Iowa; Highlandville, Decorah and Jamison, Iowa; Tonkawa, Okla.; Persia and Postville, Iowa; Blooming Prairie, Le Sueur Center and Lexington, Minn.; and New Virginia, Iowa.

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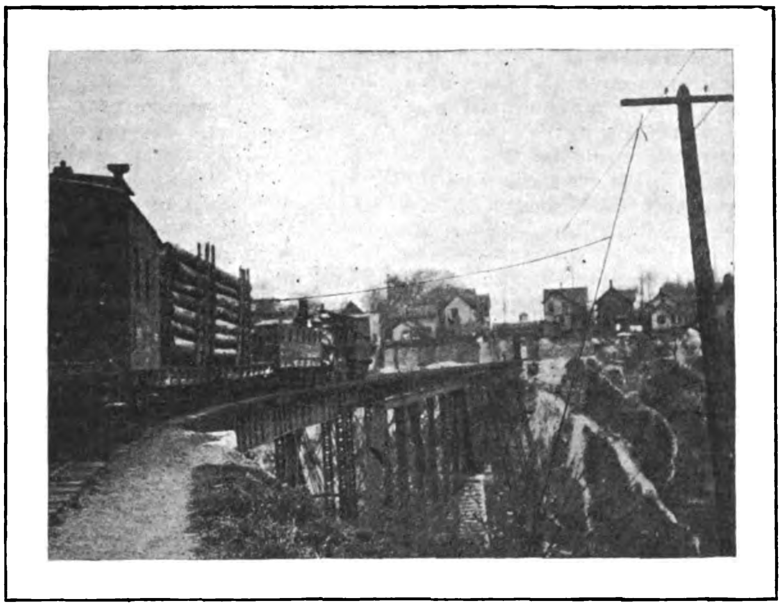
SIMULTANEOUS TELEPHONY AND TELEGRAPHY

A TEST IN THE FIELD

By John Dennis.



EXTENSION ROD HOOKED ONTO WIRE.—FIG. 1.

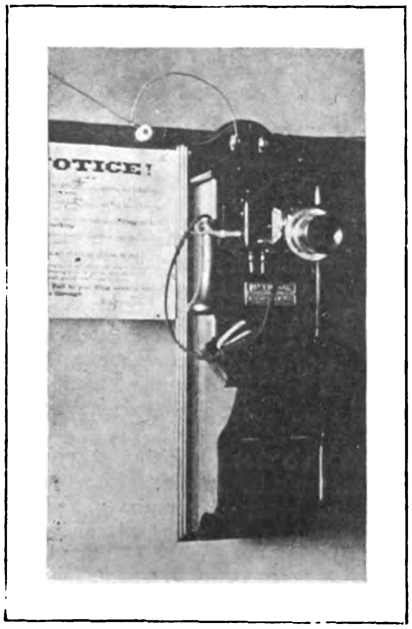
THE National Telegraphone is an appliance by which telephonic communication can be established over the telegraph wires, between a railway train halted between stations and the despatcher at either end of the division; or with a station on the line. This is accomplished without interfering with the telegraphic business on the wire; without the telegraphic business on the wire interrupting the telephonic communication, and without cutting any telegraphic or other appliances into the Morse circuit. The wire is especially equipped for the purpose, and telephone instruments are provided in cars and cabooses, at the different stations where it is thought advisable, and also in the various offices of the division train despatchers.

The first step after a train has been halted between stations is to give a call which can be made selective, on the Morse relays. This is accomplished as follows: A telescopic rod, with wire attachment, is part of the equipment of the telegraphone in the car, and by means of a file-surfaced hook or clamp on the extremity of the rod, the train instrument wire is bridged on to the telegraph wire which it is desired to utilize. In a test which the writer recently made, it was first desired to communicate with the train despatcher at Oswego, N. Y., to the eastward of the train. The selective call is given through the Morse relays by means of a direct, slowly pulsating current, generated with a magneto with two segments in its armature, one only of which is alive.

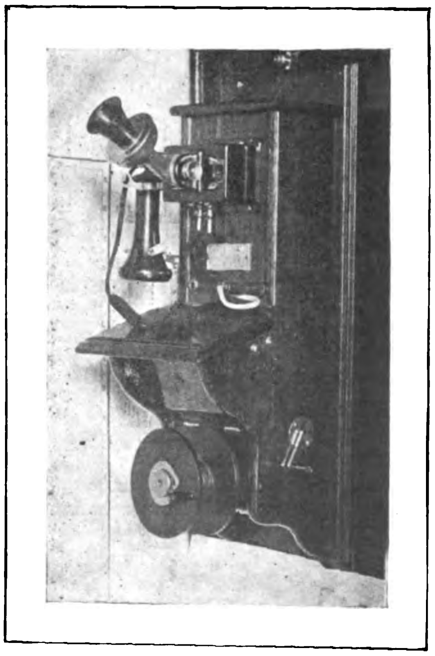
It will be understood that, if during the generating of the direct, pulsating current, it is given one polarity, the pulsating current will affect the Morse relays in the circuit according to its polarity. On the side of the bridge where the line is in direct polarity with the superposed pulsating current from the magneto generator, the latter will strengthen the battery on that part of the line, and will not operate the relays nor interfere with the normal action on the other part of the line; but, on the other side of the bridge the pulsating magneto current is in opposition to the force of the line battery on that part of the circuit which is in reverse polarity. As a result all relays on that part of the circuit are caused to annunciate a brief but significant pulsating call. Hence, when it was desired to give the signal to the despatcher at Oswego a plug was inserted in position to give the desired polarity to the magneto current. When again, it was desired to call the operator on the opposite side of the bridge the plug was shifted, changing the polarity of the magneto current and giving the pulsating call to all the relays on that side of the bridge.

At stations where Morse relays are cut in, they are bridged with dead, non-inductive resistance. It will be understood that, whereas the relay magnets are wound for 150 ohms inductive resistance, the resistance of the shunt is non-inductive; so constructed as to eliminate the factor of impedance when the high frequency telephonic current is superposed on the line. Thus again, while the very high resistance in the shunt prevents it from taking any of the Morse current on the line, it still, according to the well-known law, affords a path for the talking waves, and the shunt resistance, be-

TRACK SET.—FIG. 2.



TRAIN SET.—FIG. 3.



ing non-inductive, the talking waves pass without being impeded or interrupted. As has been said, the shunt is of so much higher resistance than the relay that it takes no operative current from the Morse circuit.

A condenser, connected into the secondary of the telegraphone instrument, prevents the Morse circuit from being grounded.

Through the courtesy of J. G. Halleran, trainmaster of the Oswego district of the Rome, Watertown & Ogdensburgh division of the New York Central Railway, a locomotive and tool car were placed at the disposition of the writer, despatched to the eastward under the orders of the despatcher at Oswego. The trip was made over a busy single track railway, but it was understood that a stop could be made between stations at discretion. Between Rochester and Oswego there are many telegraphic stations. A heavy rain was falling, electrical conditions thus lending themselves to the breakdown test which had been determined upon.

Between Windsor Beach and Sea Breeze stations the writer unexpectedly called for a stop, and the wrecking outfit came to a halt on the main line. One of the train crew attached the wire from the reel of the train instrument to an extension pole, with a clamp on its extremity and hooked it over a commercial wire which was crowded with messages. A quick, pulsating and distinctive call was made through the relays on the line on the side towards Oswego, and, within thirty seconds from the time the special had halted, communication was established with the train despatcher at Oswego, and the train placed under his orders.

As soon as the despatcher had taken measures to protect the special from other trains, the writer took the car telephone, and subjected the appliance to a severe test. After calling Trainmaster Halleran, in his office at Oswego, to the telephone, and exchanging condolences on the dismal weather, by simply changing the jack in the caboose instrument the agent at the Rochester office was called in turn in a similar manner. The Rochester operator quickly jacked the Telegraphone in with the Rochester Telephone Company's exchange, at Rochester, and a conversation was held from the wrecking outfit, otherwise isolated between stations, with Superintendent of Construction Charles O. Harris, of that company. Then, without delay, the writer's home telephone was called, and he was talking with his family as plainly as from his downtown office.

Again the Oswego despatcher, who had been constantly in touch with the isolated train, was called, and orders for the movement of the special were taken by the trainmen. One of the men removed the pole, and the wire was reeled in, and the special started on its return trip.

The photographs give a good idea of the appearance of the apparatus, and how the connection is made by means of the extension rod and hook. Fig. 1 is a graphic view of the rod hooked to the telegraph wire, with the train halted and receiving orders from the despatcher. Fig. 2 is the track set, or the instrument which is used at stations, while Fig. 3 shows the train set, the one which is used in the cars.

When it is stated that this test was made without grounding or interrupting the Morse current, excepting as to the few distinctive clicks of the initial call, and that the talking was done as described over a commercial wire crowded with messages, that the train was halted "wildcat" between stations, it requires no extended comment to be fully understood by railroad men and train despatchers. Its value in case of wreck is simply incalculable, as its operation is absolutely unerring. From the wrecking crew, other trainmen, despatchers, station operators and railway officials, it was learned that the appliance is regarded as one of the most important adjuncts of train administration.

The telegraphone is also being tested by the Santa Fe and Rock Island railway companies in the central part of Kansas with a view to installing the device if it is proven to be practical.

On May 14, the Santa Fe had the equipment in the way car of westbound local freight No. 63, between Topeka and Emporia.

The first stop made by the train was at Pauline, seven miles west of Topeka. The line from the car to the telegraph pole was hooked in an instant and the circuit was in working order. An operator then took the receiver from the hook, whereupon the relay in the office of the chief despatcher at Topeka acted as a buzzer and notified another operator that connection had been made and that some one was wanted at the telephone. Stepping to the instrument the despatcher took down the receiver. Instead of putting it up close to his ear he held it about four inches away. This was done to avoid the buzzing of the telegraph wires which were in use at the time. A number of office employees heard the message sent from the station seven miles away as distinctly as if the connection had been in the usual telephone manner.

When the telegraphoning had been completed the wire at the train end of the line was detached from the telegraph wire by means of the jointed pole and the train advanced to Carbondale, the next stop, where another test was made with the same results. It is 63 miles from Topeka to Emporia and at almost every stop connection was established between the train and the chief despatcher's office, and a conversation carried on over the telegraph wires.

The chief despatcher for the Santa Fe at Topeka in commenting on the new invention said: "If this invention lives up to the claims made for it, it will be of especial advantage to us when trains break down or are ditched between stations. As it is now, when any accident happens that the train "goes dead" between stations, one of the trainmen has to walk to the nearest station to make a report. Often this is many miles and requires hours of walking. If it is a little station that the trainman reaches in the dead of night, he is not apt to find the station agent or the despatcher without the loss of a great deal of time. When he finds his man he has to make such report as he is able. With the telegraphone in the waycar of the train, things would be vastly different. In a very few minutes the conductor could have this line attached to the telegraph line. In each way car will be a diagram of the wires with instructions so that the trainmen will know just what line to connect with in order that connection will be had in a proper manner with the instrument in the despatcher's office, and immediately the conductor will be able to make his report and get his instructions."

THE CONSTRUCTION OF TOLL LINES

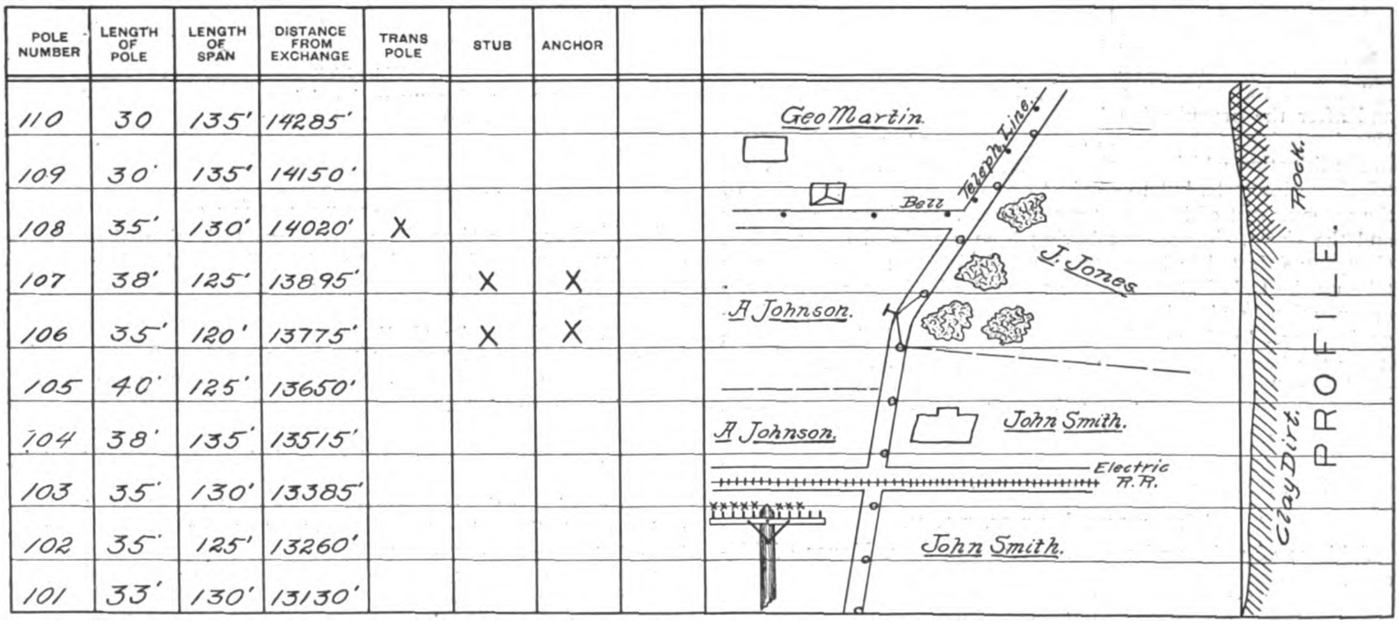
By W. P. Beardsley, Supt. United Telephone & Telegraph Co., Altoona, Pa.

The construction problem, which but a few years ago was hardly more than a matter of fastening wires to almost any kind of a pole, at distances immaterial, has developed into quite a complex, serious problem—one of such magnitude and diversity that to cover all points which merit consideration would require the setting forth of complete specifications and full instructions, covering every feature and detail of the work, together with numerous drawings, diagrams and charts. This statement places before the imagination an array of blue prints, mechanical calculations and the general insignia of the engineer, very necessary in most cases, indispensable in others, but obviously not attainable in all.

In choosing the proper location for a toll line, the territory to be traversed must be considered, and rights-of-way obtained. Incorporation under state laws frequently carries with it the right to build pole lines on all public roads in such a manner as shall not interfere with their use for purpose of traffic, yet it is essential to obtain the written consent of a majority of the board of supervisors in each district. As absolute property rights are rarely vested in the supervisors of county roads—their power only extending to the use of the road for definite purposes of traffic—the question of the rights of adjoining or abutting property owners is one of very great importance and demands extreme judgment on the part of those securing the desired right-of-way.

We cannot presume too much on a recent decision granting to telephone companies the right of eminent domain, for by another recent decision of the courts of Franklin county, Pa., Judge Stewart upheld the owners' refusal to grant permission to the Pennsylvania Telephone Company, which sought to obtain possession of two fields, holding that telephone companies do not have the right of eminent domain so far as going upon private land is concerned, nor have they the right to build lines upon highways adjoining land, without giving the land owners damages. The better plan therefore, when it is necessary to consider these property rights, is to secure from the owners separate specific contracts defining the rights of both parties, which will insure future non-interference, and at the same time the compensation demanded for the privileges granted, and oftentimes the furnishing of some slight service may economically cover all demands and insure the co-operation of the property owners. After the securing of these rights-of-way, they should be acknowledged before a Notary or Justice of the Peace, recorded at the county court and made a matter of record, thereby obviating any future disputes as to rights.

After procuring all necessary ordinances, private property rights-of-way, railroad wire crossing agreements and supervisors' agreements, the necessary location of all poles should be determined and indicated by stakes, noting thereon the size of the pole desired at that particular point; a record of this should at once be taken in a "Field Book" carried by the engineer in charge, noting the pole number, length of pole, length of span to next pole, distance from exchange. If transposition pole, it should be so designated by the transposition letter on stake, and if a stub or anchor guy, so noted. On the opposite page of book should be shown a plan of the line with a profile map showing grade, together with the names of abutting property owners, and any information that might be useful for future needs. Variations in ground level should be compensated for as nearly as possible by corresponding alterations in pole heights, and greater stability at turns secured by varying the size of the poles to conform with the probable unbalanced strains in the erected line.



POLE NUMBER	LENGTH OF POLE	LENGTH OF SPAN	DISTANCE FROM EXCHANGE	TRANS POLE	STUB	ANCHOR	
110	30	135'	14285'				
109	30'	135'	14150'				
108	35'	130'	14020'	X			
107	38'	125'	13895'		X	X	
106	35'	120'	13775'		X	X	
105	40'	125'	13650'				
104	38'	135'	13515'				
103	35'	130'	13385'				
102	35'	125'	13260'				
101	33'	130'	13130'				

FIG. 1.—SAMPLE PAGE TAKEN FROM FIELD BOOK.

By referring to sample page shown in Fig. 1 taken from "Field Book" referred to, it can readily be seen how well the construction department can be kept in touch with just what amount of work is being done daily by the foreman in charge, who should make an itemized daily report of all materials used, together with a detailed report of all work accomplished. Upon its receipt, by referring to the plan of line, it can readily be seen just what distance was covered and what size poles were erected, and by the profile just what nature of digging the men had to contend with, which enables the superintendent to judge whether a good day's work has been accomplished by the foreman in charge.

After the line is completed, this book is of invaluable service to a telephone company for future reference. For example: John Smith desires a telephone at his farm. Instead of sending a man in a horse and buggy a distance of two miles and a half to ascertain the amount of material necessary to install the telephone, by referring to the "Field Book" you can tell at a glance that the distance is one hundred and five poles, or 13,650 feet from the exchange, and from the pole diagram that two pins are vacant on the arm, viz.: nine and ten; double your total distance in feet for a metallic circuit and you have the required amount of line wire; double your total amount of poles and you have the required amount of glass. No matter what question is ever brought up in connection with the line, whether it be the application for a telephone, or a dispute concerning trimming, right-of-way, or change of pole location, an accurate and intelligent answer can be given in but a few minutes' notice.

After obtaining the information as set forth, we are in a position to make an intelligent estimate on the cost of the line. Assuming that we have a line of ten wires to build five miles long, with comparatively easy digging and no rights-of-way to purchase, the cost would be as follows:

No.	Material.	Each.	Total.
50	35 ft. chestnut poles	$3.00	$150.00
150	30 ft. chestnut poles	2.50	375.00
5	25 ft. chestnut stubs	2.00	10.00
210	10 pin cross arms	.39½	82.95
2,100	Locust pins	9.50	19.95
210	Pr. 28-inch G. I. braces comp.	.18½	38.85
2,000	Pony insulators	10.75	21.50
100	Transposition glass	116.50	11.65
190	⅝x14-inch Mch. bolts	6.77	12.86
10	⅝x16-inch Mch. bolts	7.25	.73
500	2-inch Sq. washers	1.05	5.25
1,500	Guying strand, 5-16	11.52	17.28
20	3 bolt guy clamps	.13½	2.70
5	6 ft. guy rods	.27	1.35
5	Thimbles	.04	.20

WIRE COST.

25 No. 12 G. I. wire for light rods	$.04¾	$1.19	....
8250 No. 10 B. & S. H. D. copper wire	.14⅔	1210.00	...
125 No. 10 B. & S. H. D. copper wire for ties	.14⅔	18.33	...
300 No. 10 McIntire sleeves	.06	18.00	...
			$1,997.79

LABOR.

1 Foreman 21 days at $70 per month	...	56.54	...
4 Linemen 9 days setting poles and stringing wire at	$2.50	90.00	...
2 Groundmen 9 days setting poles and stringing wire	1.50	27.00	...
5 Groundmen 12 days digging holes	1.50	90.00	...
1 Team 21 days	3.50	73.50	...
2 Men staking line 2 days	2.50	10.00	...
			$347.04

INCIDENTALS.

205 Stakes	...	$2.50	...
1 Horse and buggy 2 days staking line	$2.00	4.00	...
Incidental expenses	...	15.00	...
			$21.50

SUMMARY.

Material	$1,997.79	
Labor	347.04	
Incidentals	21.50	
Total cost of line		$2,366.33

In the foregoing statement the price as quoted for poles is on standard poles of the best quality live chestnut, squared at both ends, reasonably straight, and well proportioned from butt to top, and of the following dimensions: 25 inches circumference at the top and 37 inches circumference 6 feet from the butt, delivered at the holes. The "labor" is based on the employment of one foreman, four linemen and seven groundmen, together with two men surveying and staking out lines.

A peculiarity of toll line construction is that the local conditions are of such importance that methods particularly suitable in one case might be altogether unfitted for another.

There have been so many able articles written on this subject, together with the publication of complete specifications for this class of construction, that it would seem useless to extend this article by their repetition.

PROGRAMME OF THE NATIONAL CONVENTION

JUDGE THOMAS ANNOUNCES HE WILL RETIRE

PRELIMINARY arrangements for holding the annual convention of the Independent Telephone Association of the United States of America are being made. The convention will be held in Chicago on June 24 and 25, as announced last week in THE AMERICAN TELEPHONE JOURNAL.

Judge James M. Thomas, who has been president of the Association since its organization, has announced his intention of retiring from the presidency. In a revised statement to a representative of THE AMERICAN TELEPHONE JOURNAL in this connection, the Judge said:

"After serving for six years, my determination is to retire as president of the Independent Telephone Association of the United States. I hope the organization will be placed in the hands of men who are familiar with the operation of telephone systems and the technical side of the telephone business, so that it may be a factor in the educational side of the business, so far as the economy in operation and maintenance of telephone exchanges and toll lines is concerned.

"The chief object of the organization originally was protection, and after the organization had been perfected six years ago, it was determined that it would be wise not only to assist financially in the litigation which was threatening the life of the Independent telephone interests, but to conduct or to take charge in a way of the management of important patent cases, especially the Berliner and the Carty. That work having been completed and the Bell Company defeated in its contention, it is felt that we should now take up the technical side of the telephone business, and that the organization be placed on the same footing as other electrical organizations. In view of this, as I am not a technical man, I deem it for the best interests of the Association that I retire from the presidency."

The programme committee has completed a programme for the convention which, if carried out, will prove both interesting, instructive and entertaining. The programme, as announced this week, is as follows:

WEDNESDAY, JUNE 24, 2 P. M.

Address of welcome by Hon. Carter Harrison, Mayor of Chicago.

Response by Hon. S. P. Sheerin, of the New Telephone Company, Indianapolis, Ind.

Annual address by President James M. Thomas, of New York.

Paper, *Advantages of Association*, by Hon. C. E. Hull, Salem, Ill., president of the Inter State Independent Telephone Association.

Paper, *The Telephone and the Technical School*, by J. C. Kelsey, Prof. of Telephony at Purdue University, Lafayette, Ind.

Paper, *Modern Exchange Construction*, by W. H. Johnson, general superintendent of the Frontier Telephone Company, Buffalo, N. Y.

Paper, *Independent Development in the South*, by C. E. Stinson, president of the Memphis Telephone Company, Memphis, Tenn.

Paper, *Western Telephone Development*, by J. S. Bellamy, of Knoxville, Iowa.

WEDNESDAY, JUNE 24, 6 P. M.

Concert in Auditorium Hotel.

WEDNESDAY, JUNE 24, 8 P. M.

A special train will convey the delegates to San Souci Park, where an elaborate entertainment will be arranged for by the Entertainment Committee.

THURSDAY, JUNE 25, 10 A. M.

At this hour the Committee on Patent Litigation, through its chairman, Hon. Hugh Dougherty, of Bluffton, Ind., will make its report as to the conduct of the Berliner and Carty Patent Suits, and others.

Paper, *Discipline*, by C. E. Tarte, general manager Citizens' Telephone Company of Grand Rapids, Mich.

Paper, *Eastern Telephone Development*, by F. A. Demarest, general manager of the Interstate Telephone and Telegraph Company of Trenton, N. J.

Paper, *Present and Future*, by Frank L. Beam, of Columbus, Ohio.

This concludes the programme so far as the reading of papers and general discussion is concerned. It has been arranged to have full discussion of all the papers.

An hour or so has been set aside for general business, such as receiving new members, making official announcements, etc.

After all business has been disposed of a nominating committee will be selected to nominate candidates for officers of the Association. The election of officers will terminate all business of the convention, and an adjournment will be taken.

CONTEMPORARY CROSS TALK

By "The Listening Key."

THERE is another view of the importance of accuracy in operating, which has to do with the value of the time lost, of the work done uselessly, through wrong connections and other errors in operating. From the point of view of the general value of the service to the user, there can be no question that accuracy cannot be prized too highly. It is not to be denied that errors sometimes arise from the faults of the subscribers themselves, but the question of educating the subscriber to become good operators of the service has already been discussed rather extensively, so we will not enlarge on that aspect of the case here. Moreover, the telephone exchange managers in dealing with complaints are a little too apt to act on the defensive and to throw the blame on the subscriber if there is any possible excuse for doing so. There is really no excuse for this sort of thing, unless the trouble is clearly and beyond any possibility of a doubt due to the subscribers' mistake. This tendency of exchange managers is so strongly to be reprehended that the possibility of the subscriber being responsible for an error will not even be discussed at present. All errors that occur are to be considered due to the operator. Errors do occur daily, and in fairly large number. They cause annoyance and irritation to the subscribers, and they cause loss of time of the operating staff and plant that would represent, in the aggregate, a very serious financial loss were a large percentage of errors allowed to occur regularly in a busy system.

Two Lines Used Unprofitably

Even if one considers the simplest case of error, not attended by serious complications, as the medical men say, it is evident that a complete cycle of operations is performed by the operator uselessly, and that two lines are used unprofitably for a time that may vary from forty to eighty or ninety seconds. The work of the operator in making and unmaking that connection is entirely thrown away, and she probably has a little extra work over it, as a complaint is almost sure to be made by the calling subscriber, entailing more or less conversation on the part of the operator. Therefore for every wrong connection we have on an average of say about a minute's time wasted for each of the two lines, and we have useless work done by the operator equivalent often to the work or the time required, which comes to the same thing, for making two correct connections. If, in a system of 5,000 subscribers' lines with an average traffic of 12 calls daily per line, there were one per cent. of errors in operating, the aggregate time wasted, as far as the subscribers' lines were concerned, would be 20 hours daily, and the useless work done by the operators would be equivalent to about one operator's whole working time, say from $300 to $400 a year.

Accuracy Has Commercial Value

From this little calculation it is seen that accuracy in operating has an important commercial value to the telephone company, and it is worth while spending something to secure it. There are other kinds of errors besides wrong numbers, though this class is the most frequent and most annoying to the subscriber, and in a system where the training and supervision of the operators are not made a thorough study, the percentage of errors will easily rise well above the figure of one per cent. that we have taken for the sake of example. So that a manager who spends time and money on training and supervising his operating staff with the object of securing and maintaining smooth and accurate operating is working absolutely in the right direction from all points of view. If he tries to save money on the training of his staff, he will lose it later through their wasteful and inefficient work, and at the same time as he directly loses money in this way, he indirectly loses much more by forfeiting the good will of his subscribers, some of whom suffer daily annoyance and loss of time through the slackness and carelessness of the operators.

Operators Cannot Work Alike

Having got our operators to the point of being uniformly civil and uniformly accurate, the next thing is to get them to be uniformly quick. That we shall never do. And for the simple reason that some people are physically, or perhaps it is mentally, incapable of as quick movement as others. Common observation shows us that there is a wide range of speed at which our fellow beings perform certain motions. Machines of all kinds can be made to work at certain definite speeds. From the dollar watch to the 10,000 horse-power engines of the Atlantic liner, there are millions of machines that work at absolutely uniform speeds, hour after hour, and day after day. But each human machine has its own rate of speed and seldom do two human beings or any other two animals for that matter do the same operation at exactly the same rate of speed. If it were otherwise there would be little interest in races and other sporting contests. Ten men run a hundred yards in the same time within a fraction of a second; but the fraction of a second difference between the first man and the second makes all the difference in the world. A race between locomotives or steam yachts has comparatively little interest, but a race between horses or men makes the heart beat faster, because of the uncertainty that flesh and blood introduce as compared with steel and steam.

An Illustration and Comparison

The nearest approach to the conversion of men into machines, doing the same operation at the same rate of speed, is probably a regiment of soldiers at drill. But even there the quick eye will discern that the rate of speed is not absolutely uniform; some swords leap out of the scabbard more slowly than others, some rifles "slope," or "ground," or "present," a fraction of a second behind others. Instantaneous photographs, which show many queer things, would show this very clearly. It is impossible then, to get uniform quickness from a group of human beings performing a given operation; and it would be equally impossible to get uniform slowness, since the restive and impatient natures would always assert themselves. And this is true, even when all are trying to do the same thing at the same time at a signal or word of command. There is naturally even more difference when all are doing different things at different times, and there is neither the word of command nor the evidence of what the others are doing to stimulate and assist.

Operators Work Independently

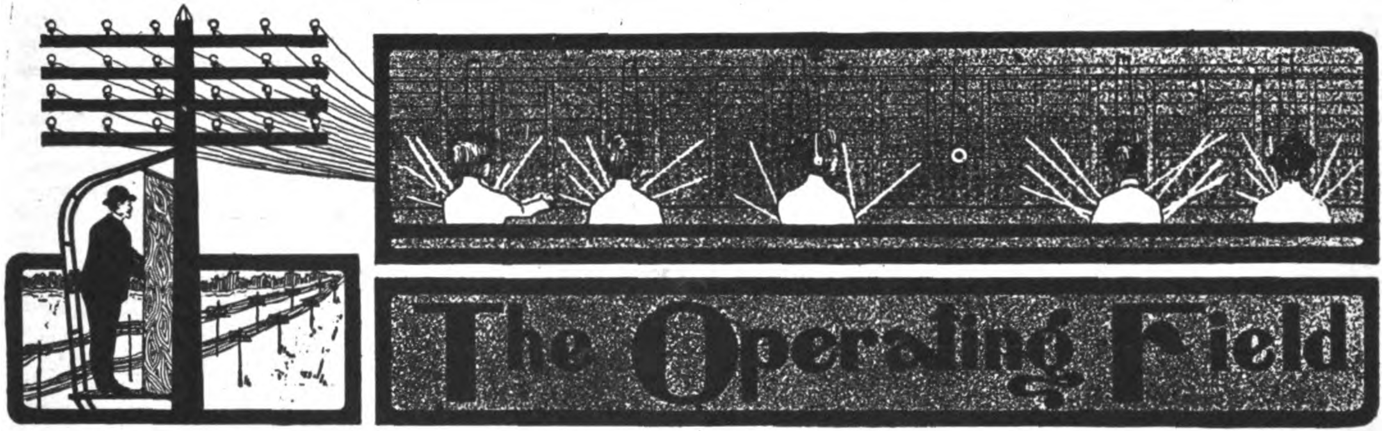
In telephone operating each operator is doing things on her own hook, so to speak, working quite independently of her neighbors on either side and listening to no single word of command from a single source, but to a continuous stream from numerous sources, often coming in small volleys almost simultaneously. She works, in any case, at her own individual rate of speed, determined by her individual characteristics and natural capacities, and this in turn is modified by the rise and fall of the stress of the work itself, which at different times of day makes very different demands on her energy and intelligence. Therefore uniformity, that is, absolute uniformity among all operators at all times, in speed of working is not to be expected of the human telephone operator. The mechanical operator might give it, but it is not very likely that the mechanical operator will ever displace the human operator on a large scale—not at least until a mechanical subscriber is invented to go with it.

Be Alert and Attentive

However, absolute uniformity of speed in working is not required of telephone operators, even if it were obtainable. What *is* required is that they shall be as quick as they can be in their movements and always alert and attentive. This is a most important point, as operators waste far more time because they do not see a signal as soon as it is made than because they are slow in making the requisite movements to answer it when they do see it. This is doubtless one reason for the quicker operating that obtains with lamp signals than formerly obtained with indicators; the lamp signal is more assertive and can be seen out of the corner of the eye as it were, so that an operator, even when examining the next girl's back hair and wondering if it is all her own (telephone operators are still human and feminine), is instantly aware of a signal when it is a lamp, whereas a drop would disturb her reveries not at all. Of course, an operator should not inspect her neighbor's back hair, nor her front hair, nor anything that is hers, but should keep her attention entirely on her position. If she sees her signals instantly and attends to them instantly and carries out the orders that result from them instantly and accurately, the speed of the slowest moving girl will generally be sufficienly rapid to satisfy the most exacting subscriber.

The Main Points

Strict attention to business, then, and reasonable alertness are the main points in making up speed in operating. In the actual time occupied in inserting a plug in the answering jack and depressing a listening key, the difference between the quickest girl and the slowest will be but a fraction of a second, and similarly in the next operation of finding the multiple jack, and putting in the connecting plug. But it is just that fraction of a second, all the same, that makes the difference between the winner of the hundred yard sprint and the loser; and at the switchboard it marks the difference between the superior operator and the one who is quick and efficient, but not quite as quick as it is possible to be. Those fractions of a second count amazingly in the aggregate, and they are worth striving for, but it must not be forgotten that it is given to some to gain them and not to others. As high a standard of speed as can be obtained must be insisted on, and operators who are constitutionally slow and get snowed under at busy times must be weeded out. And when all has been said and done the discouraging fact remains that the subscriber's answer to the call really dominates the situation and, as far as the calling subscriber is concerned, determines the time occupied in completing the connection.



ANOTHER BELL PATENT SUIT DEFEATED.

INDEPENDENT telephone men won another signal victory against the Bell Telephone Company this week. The suit was the Western Electric Company, which is the manufacturing end of the Bell Telephone Company *vs.* the North Electric Company, and was over the Warner tubular drop, patent number 477,616, which patent was issued June 21, 1892. The North Electric Company was alleged to be infringing on this patent by the Western Electric Company, which brought the suit. The case was tried before Judge Ewing, sitting in the United States Circuit Court, for the Northern district of Ohio. Attorney A. L. Lawrence represented the North Electric Company and obtained a complete verdict in favor of his clients. Not one of the contentions of the complainants were sustained by the judge, who declared the invention lacked novelty. This decision adds another to the long list of Independent victories over the Bell Company in the patent line.

THE INDIANA TOLL MOVEMENT.

IT is stated on good authority that the organization of the Northern Indiana Telephone Company, as stated last week, will result in a gigantic Indiana toll line system. The company was incorporated with a capitalization of but $10,000, but the development of the plan will mean a company with a capital stock of at least a half-million dollars.

The formation of this company is the outgrowth of a meeting of twenty-five Independent companies at Logansport, Ind., the object of the meeting being to continue plans for through long-distance lines in the northern part of the State.

Walter Uhl, of the Logansport Telephone Company, who is one of the principal promoters of the new toll organization, in telling of the scope of its operations, said: "We will have lines running the full length of Indiana in all directions, and will be able to give connection with almost any city in Michigan, Ohio and Illinois. Our object is to form an organization that will give to Independent subscribers a better toll and long-distance service than the Bell Telephone Company is now giving.

"We will construct three main lines from this city to start with, and these will be supplemented with others, which will give us the service we desire. The principal headquarters of the company will be in this city. The local offices of our company will be used at first, after being considerably enlarged, but the new company may decide to erect a building of its own, maintaining a separate exchange for the toll work."

FINANCING PLANS DECIDED ON FOR CUYAHOGA.

A SPECIAL meeting of stockholders of the Cuyahoga Telephone Company was held on March 21. Over ninety per cent. of the stock was represented and there was over eighty per cent. of the stockholders present. President Frederick S. Dickson, in his report to the stockholders, outlined a plan for refinancing the Cuyahoga, which was looked on very favorably by the stockholders. There seems no doubt now but that the Cuyahoga Company will be put in first class condition, on a successful operating and firm financial basis. President Dickson's report, which fully explains the proposed plan, is as follows:

> At our annual meeting in February we reported a deficit at the end of 1902, carried over from the past, of $29,684.70. On the first of February this deficit had been reduced to $23,382.66; on March 1st to $16,801.49; on April 1st to $9,089.08, and on May 1st to $1,971.66. The first of June will, doubtless, show a surplus instead of a deficit, and this surplus we hope to increase in the future.
>
> During 1902 the expenses were 51.06 per cent. of the earnings; in January they were 48.87 per cent.; in February 46.52 per cent.; in March 45.88 per cent., and in April 46.07 per cent. During the four months ending April 30th, a total of $12,472.55 was expended out of earnings for the development of the plant, in addition to the ordinary expenditures of $25,270.73 for maintenance. This maintenance charge shows our expenditures for keeping this property in order, while the expenditure of $12,472.55 represents new work, adding to the value and extent of your property. The Cuyahoga Telephone Company is, however, hampered by a debt of $478,505.78 due the Federal Telephone Company, which, when contracted, was expected to be satisfied by the issue of bonds. The Cuyahoga Telephone Company has never been able to issue any part of these bonds, and it is impossible to say when the Company will be able to issue them. It is therefore proposed to issue 30,000 shares of six per cent. cumulative preferred stock of the par value of $50 per share, and the Federal Telephone Company will subscribe for its proportion of this preferred stock at $35 per share, using its credit with the Cuyahoga Company as cash, and thus satisfying this debt. All the stockholders of the company will be entitled to subscribe for this stock at the same price at the rate of one share for each share of common stock now held by them and the fund thus raised will be used to provide for necessary improvements in the further development of your property. The surplus, after providing bond interest and all other charges for the past four months, amounted to $27,171.06, or an average of $6,792.76 per month. If all the preferred stock proposed were issued, it would require $7,500 a month to pay the dividends thereon. This, as will be seen, the Company could very nearly do under existing conditions, and of course no expenditures would be made that did not produce increased revenues. We think it, therefore, a safe prophecy to state that the dividends upon this preferred stock will in our judgment be paid promptly from the date of issue.
>
> That the Company may not be over-capitalized, it is proposed at the same time to reduce the common stock from $3,000,000 to $1,500,000, by simply reducing the par value of each share of common stock from $100 to $50. This would leave the capital stock the same in amount as it is to-day. As the common stock is now selling in the market at from $5 to $7 per share, this reduction in the par value can work no hardship to any stockholder.
>
> If the action of the Board is ratified, I am authorized to state that we will be in a position to at once purchase a new switchboard of the latest pattern and with all modern improvements, which will enable us to give to the patrons of The Cuyahoga Telephone Company the best service possible. If this work is to be done, we will postpone the increase of our subscribers until the new board is in working order. We hope that this board will be in position to use by about the first of October next.

The stockholders of the company expressed much gratification at the splendid showing made since the first of the year. Three weeks ago the stock of the company was offered on the Cleveland market at 50c. a share. To-day it is selling at as high as $2 per share.

MINNESOTA INDEPENDENTS IN CONVENTION.

THE Minnesota Independent Telephone Association held its annual meeting in Minneapolis, Minn., on Thursday, May 21. Dr. J. H. James, of Mankato, president of the Association, called the convention to order, after which he addressed the delegates in part as follows:

"The manager of the Northwestern Bell Company in this State is reported as recently saying that there is no longer competition in Minnesota, but it is a telephone war. A telephone *war?* Do we realize what that means? It means either surrender or death to one or the other combatants. Which is it to be?

"I trust we are here to-day to meet this challenge and to still further cement our ranks and devise ways and means whereby we may present a solid front to the enemy, for I take it that we all mean to fight to the end to win a victory for the cause we represent. The enemy has no divisions in its ranks. It has its paid emissaries watching every move. It has its paid-for newspaper articles tending to throw cold water and distrust on every new enterprise of the Independents and to deter capital and brains from engaging in the work, and it is right now making the strongest fight of its life here in Minnesota.

"It is publishing and sowing broadcast solicited letters trying to show that two systems of telephones in a city are a nuisance. Only one of them can be a nuisance and the history of telephony thus far goes to prove that it is the Bell that is the nuisance. I plead for unity of action here to-day. To be successful we must have trunk toll lines paralleling both the Bell and their connecting lines. In some parts of the State these lines are being built and it is our duty to encourage and support them.

"If it is to be war we must show a united front; we must pull together in harmony. If we cloak ourselves with the idea that we are sufficient unto ourselves it will surely result in our undoing. We must be willing to meet these promoters and builders of toll lines in the same spirit they come to us, and not attempt to use them as a lever to secure an advantage with the enemy."

The following officers were elected for the ensuing year: Dr. J. H. James, Mankato, president; Hon. J. A. Tawney, Winona, first vice-president; E. L. Bradley, Duluth, second vice-president; Dr. E. G. Robinson, Norwood, third vice-president; R. F. Stark, Hector, secretary, and E. H. Moulton, Minneapolis, treasurer. The executive committee elected is as follows: Dr. J. H. James, Hon. J. A. Tawney, E. L. Bradley; E. E. Webster, Minneapolis; E. H. Moulton; E. N. Schuntz, Stewart; J. Eckloff, Cokato; Dr. Sanford, New Market; Mr. Cadwell, Windom; S. A. Vopotek, New Prague; L. L. C. Brooks, St. Paul; W. B. Strom, Hector, and W. S. Clay, of Hutchinson.

Quite a number of manufacturers and supply dealers were represented at the convention, among the number being the Vought-Berger Company, La Crosse, Wis., which had a very elaborate exhibit in charge of M. I. Berger and C. A. Sterling, which attracted considerable attention. Among other things shown was a 300-drop board just built for Stewart, Minn. Holtzer-Cabot Electric Company, of Boston, Mass., was represented by E. R. Harding; Sterling Electric Company, of Lafayette, Ind., represented by W. E. Doolittle and Clyde Dunseth; Stromberg-Carlson Telephone Manufacturing Company, Chicago, by J. J. Nate; Kellogg Switchboard & Supply Company, Chicago, by Thomas G. Seymour; Lindsley Bros. Company, Chicago, by George L. Lindsley; American Electric Telephone Company, Chicago, by Max Zabel; Pittsburg & Lake Superior Iron Company, Escanaba, Mich., by Herbert W. Reade; American Steel and Wire Company, by Edward A. Lycett; Minnesota Clearing House, by Harry B. Brookins; and THE AMERICAN TELEPHONE JOURNAL by W. H. McDonough.

THE TELEPHONE "NIBBER" PUNISHED.

THE Cumberland Independent Telephone Exchange, a farmers' line, caused the arrest and conviction of one Alfred Stevens at Cumberland, Ohio, for listening and interfering with a business conversation that was being conducted over the company's line. He was not a subscriber, but used a subscriber's telephone.

KANSAS CITY HOME COMPANY PROGRESS.

IN a recent letter to THE AMERICAN TELEPHONE JOURNAL, O. C. Snider, of the Kansas City, Mo., Home Telephone Company, says the company now has over 7,500 contracts for telephones and that they feel sure that by the time the exchange is opened at least 8,500 subscribers will have been booked. The original contract for the installation of the system in Kansas City called for only 6,500 telephones installed, so that the capacity of the plant will have to be considerably increased from the original plan.

The franchise of the Home Company was amended several weeks ago permitting it to charge an additional rate for business telephones. The rate under the original franchise was $54 a year. On and after January 1, 1907, the company will be permitted to charge $60 per year for business telephones. The rate for residence telephones is varied somewhat, but amounts to practically the same as before. The flat rate in the future for residence telephones will be $36 a year. Mr. Snider states that the construction work is progressing very rapidly, and that the company expects to start the system next October.

OPENING OF A NEW INDEPENDENT EXCHANGE.

THE Galion Telephone Company, of Galion, Ohio, has completed its plant and is now giving service to subscribers. On the opening day the Galion Company and the North Electric Company, which installed the apparatus, were "at home" to all the citizens of the town. The telephone company bought out the entire available stock of carnations in Galion to be distributed to the visitors, and when they ran out the company dispatched a special messenger to Bucyrus for 200 more. The North Electric Company distributed appropriate souvenirs to all the telephone men present, of which there were quite a number. It is estimated that over 1,400 people visited the exchange during the day, to all of whom Manager M. E. Taylor explained the working of the system.

At a recent meeting of the stockholders of the company, the following board of directors were elected: Mark Cook and A. A. Whitney, of Mt. Gilead; W. F. Vaughn, of Cardington; Sol. M. Wolf and C. R. Callaghan, of Bellevue, and J. W. Cupp, of Galion.

TOLL LINE ASSESSMENTS IN KANSAS.

THE Kansas Board of Assessors has increased the assessment of toll lines of the first class telephone companies in the state, from $40 to $50 per mile. The companies affected by the increase are the Topeka Independent Telephone Company, the Interstate Telephone Company, of St. Joseph, and the Missouri and Kansas Telephone Company. Second and third class telephone companies will not be affected by the change.

The assessments of the various companies in Kansas on their toll lines are now as follows:

FIRST CLASS.	
Poles, cross-arms, and first wire, per mile	$50.00
East additional wire, per mile	6.00
Instruments, each	7.00
SECOND CLASS.	
First wire, including poles, etc., iron, per mile	$25.00
Copper, per mile	29.00
Each additional wire, iron, per mile	2.00
Each additional wire, copper, per mile	6.00
Instruments, each	7.00
THIRD CLASS.	
First wire, including poles, etc., iron, per mile	$15.00
First wire, copper, per mile	19.00
Each additional wire, iron, per mile	2.00
Each additional wire, copper, per mile	6.00
Instruments, each	7.00

DAMAGES FOR FALLING INTO A HOLE.

J. H. POWELL, a man 71 years old, recovered $300 by suit against the city of Lexington, Ky., as damages for having fallen into a hole dug for the Fayette Home Telephone Company. The suit was originally brought against both the city and the telephone company, but was dismissed as to the latter.

GOOD OPENINGS ON THE PACIFIC COAST.

By P. KERR HIGGINS.

WITH the advent of the Empire Construction Company, of Toledo, Ohio, into the telephone field of the Pacific Coast, a new field for Independents has been opened. The Construction Company at first confined its efforts to Los Angeles, Cal., where it obtained nearly 14,000 orders for telephones. It has branched out, taking in the entire State of California. The result of obtaining so many franchises has created an immediate demand for a large force of construction men, especially linemen, foremen, etc. There being no previous demand here the Empire Company found itself somewhat handicapped and had to go slow.

There have been numerous enquiries from all over the east as to prospects for good telephone men. Linemen receive $3 per 8-hour day and foremen at the same ratio. Living costs no more in California—if anything, less. The weather is delightful and an even temperature is to be had the entire year, making this part of the country a very desirable place in which to live.

It must be clearly understood that only first-class men are wanted, as there are plenty of others in the field. The same thing applies to inside work as on outside, but in a lesser degree.

Among the places yet to be installed may be mentioned—Pomona, Riverside, San Bernardino, Pasadena, Hollywood, Long Beach, Santa Ana, Santa Monica, Covina, East Los Angeles, Boyle Heights, San Gabriel, Redondo, Compton, San Pedro, Santa Barbara and a great many others.

So far, no toll lines have been built and one can easily see what an immense field is open with so few good men on the ground.

The rate for first class inside men is from $2.50 per day up. The demand for these is not so urgent at present, but is sure to develop within the next six months, as the outside construction progresses.

The Editor's Page

THE WAY TO MEET BELL "COMPETITION"

THE course adopted by the Ithaca (N. Y.) Telephone Company is to be recommended to other companies that are meeting with the sort of opposition the Bell is offering just at present to Independent development. For months the Bell has been putting out a series of articles through the Ithaca newspapers misrepresenting the whole Independent situation. To the credit of the Ithaca papers it is to be said that they refused to run these articles as pure reading matter, unlike the papers in many other localities, but insisted on marking them plainly at the bottom with the usual sign, "Advt." After submitting patiently to this sort of blackmail without attempting refutation or reply, the Independent company finally issued a statement through the Ithaca papers, which, the public was advised, would be the company's "final answer and explanation as to any misleading statements that have been or may be published by our competitors, whether at regular advertising rates, as heretofore, or otherwise."

The "statement" then proceeds in a calm, dispassionate and thoroughly fair-minded manner to give the real facts concerning telephone opposition. It is an admirable document and one that could be circulated with advantage by any company that has similar conditions to meet. It runs in part as follows:

"For about twenty years the people of Ithaca had poor telephone service and at high rates. The company furnishing the same repeatedly refused the demand for improved service and reasonable rates, stating that the desired result was impossible to be secured.

"The business men of our city, becoming disgusted with the Bell Company's methods, caused a detailed and careful examination to be made as to the possibilities of securing satisfactory service at proper rates through the Independent system.

"The result was that a considerable number of our well-known citizens joined in the organization of this company and in the building of an exchange, which we believe is furnishing to the people of Ithaca better service than they believed to be possible at the time the company was formed. A large list of subscribers was secured at prices long demanded by the public, and to-day, after giving nine months' service, we have several hundred more subscribers than the Bell Company had at the time of our incorporation.

"The Independent movement is of but seven years' growth; the Bell being nearly twenty-five years. Previous to opposition, Bell subscribers everywhere paid very high rates for very poor service. After the Independents were firmly established in a number of States and were giving good service at reasonable rates and had won the important patent suits brought against them by the Bell, then did the Bell Company begin to improve its service and make new rates. Is this not true of Ithaca? How long ago did the change occur? As a rule, however, with improvement in the quality of Bell service, rates were advanced—*unless competition existed.*

"The New York and Pennsylvania Company, like all other companies using Bell telephones, do not own the talking parts of their telephones. These parts—the transmitter and the receiver—are owned by the American Bell Company, and each is termed an instrument. Thus, it takes two "instruments" to make one Bell telephone. These two instruments cost Independent companies $3.50 and no royalties. All Bell companies must pay on their instruments annual royalties. This is one reason why the Independent companies can furnish permanently good service at less rates than can Bell companies. All Bell companies were capitalized, not on the basis of cost, but on the earning values before competition. Independent companies, as a rule, are capitalized on the basis of cost. The Bell capitalization is often two and three times that of its competitors, which is another reason why as favorable rates cannot be made permanently by the Bell companies as by the Independents."

SIMULTANEOUS TELEGRAPHY AND TELEPHONY

ONE of the most important questions before telephone men to-day is simultaneous telephony and telegraphy. The telephone art, while in many respects the most flexible in the domain of electricity, requiring constant re-adjustment in order to keep up with modern demands, has in many directions come to rest on a fixed basis. Its principles, after a quarter of a century of incessant experiment, have become settled along certain lines. There are, however, a number of important questions that are still open. To the solution of these it is the duty of all progressive telephone men to turn their attention, for upon their proper handling will depend, in a very large measure, the continued growth and prosperity of the business. At present there is no other industry in the world, with the possible exception of the automobile, that is developing at such a remarkable rate. In order that this development may be maintained the telephone man must keep in advance of present conditions and look to the possibility of new and extended fields. He must be constantly on the lookout for the utilization of his plant along new lines; in other words, he must go through the process that has characterized every other modern industry of finding methods that will cut down the cost of operation. Other industries have found profitable development in the production and marketing of "by-products," the utilization of material that, under the old system went to waste. The millions made by the Standard Oil Company have come very largely through the perfection of processes that have enabled this company to produce marketable merchandise out of material that, in the early stages of oil refining, was discarded. The packing industry made millionaires of men like Armour and Swift and Cudahy because they were progressive enough to get away from the methods of their less intelligent competitors. Instead of remaining content to see half their slaughtered beeves thrown into the rubbish heap, they devised means for using up every hair and every drop of blood. It is the recognition of this idea along entirely different lines that will make progressive telephone men prosperous beyond their less progressive competitors. The operator who solves the question of getting twice the service out of his plant that his neighbor gets will forge ahead and ultimately control the situation. Every one who has given the subject any thought realizes that there is a tremendous waste under present conditions in the telephone plant. The machinery is in use less than one-tenth of the time that it might be without any increase in the cost. The problem then is to extract the other nine-tenths of possible usefulness, or as much of this nine-tenths as may be. THE AMERICAN TELEPHONE JOURNAL, in the belief that the industry has here one of its most vital questions, means to devote considerable space during the coming year to the discussion of problems for the creation of "by-products." As a beginning we are publishing, this week, an article on the simultaneous use of the wire plant for telephoning and telegraphing. This article, which deals with the telegraphone, has been applied only so far in railroading, but there are undoubtedly greater possibilities in sight, and this article will be followed up by a series of others on the same subject pointing out how telephone wires may be used to the best advantage through the addition of telegraph service. It is already the case that on many busy toll lines employed by the Bell, all appointments are made by telegraph over the lines, so that the wire may be in uninterrupted use for speaking purposes. In this way a considerable economy is effected in the service. The Independents who are now entering extensively on toll business will soon find that an up-to-date system will bring them so many customers that they cannot afford to use their lines for their own service work.

In France, as was recently pointed out in THE AMERICAN TELEPHONE JOURNAL, the capacity of the limited system there has been very much increased by the adoption of a system under which wires are left entirely free for the use of subscribers, all service messages being handled otherwise.

FOREIGN CURRENTS

By "The Arrester."

THE recent issues of the London electrical journals contain long reports of the visit of the Institution of Electrical Engineers to Italy. From a combination of circumstances there is little mention of telephone affairs; apparently all modern electrical engineering progress in Italy is in the direction of what the average electrical man, who knows nothing of the science of telephony, delights to call "heavy" engineering—meaning power plants, street railway systems, factories and electric light stations. Our confreres of the British electrical press are also somewhat of the "heavy" order themselves, and having little acquaintance with the subject of telephony, show small interest in the subject and rarely publish any telephonic matter beyond items of news. Consequently, although the Institution was received with open doors everywhere and conducted to the biggest and best and newest of everything, and all its doings and goings and seeings are chronicled in full by all the electrical papers, the telephone in Italy is passed over in silence by all but one journal. In the *Electrician* we read: "The telephone exchange also claimed the attention of only a few, most of our party belonging to the branches of 'heavy' electrical engineering. The telephonic system in Milan is now being modernized according to the best methods. Underground lead-covered and paper-insulated cables, made by Messrs. Pirelli, are used from the sub-exchanges to the central exchange, and thus secure immunity from interruption through snowfalls or contacts with trolley lines. A special air-drying plant is provided for these cables at the central exchange for this purpose in accordance with modern practice. The present number of subscribers is 3,500, but the exchange is designed for an ultimate capacity of 10,000."

Growing Importance of Telephony

Some comment is made on the composition of the new council of the Institution, which, partly in view of the approaching International Telegraph Conference, to be held in London in May and June, and partly in recognition of the growing importance of telephone engineering—in spite of it being of a light weight character—is largely made up of telegraph and telephone men. The Institution was originally the Society of Telegraph Engineers, but nowadays it rarely has a telegraph or telephone paper and but occasionally is its President even partly connected with telegraphy or telephony. The new President, Mr. Robert Kaye Gray, is one of the foremost submarine cable engineers in England. The first Vice-President is Mr. John Gavey, Engineer-in-Chief to the Post Office, and in that capacity responsible for the Government technical policy in telegraphs and telephones. The telephone has also two other representatives and wireless telegraphy is represented by Prof. Heinning, Mr. Marconi and Sir Oliver Lodge. As these gentlemen are hardly in the same camp on the wireless question it is to be hoped that the council meetings will be properly attuned. With the telephone so well represented on the council perhaps we may now expect some telephone papers at the Institution, which will enable us to judge how the science as well as the business of telephony stands in England.

"Wireless" Telephony In England

The general interest in wireless telegraphy has been taken advantage of several times of late by two persons in England to give exhibitions to representatives of the lay press of the so-called Orling-Armstrong wireless system. Among real workers in the wireless field there is not much belief in the efficacy or practicability of "wireless" telephony. That it is possible, under certain conditions, to telephone considerable distances by conduction through the earth or by induction through the air, has been known for many years, and since "wireless" work has become the fashion "systems" based on these old experiments are continually cropping up. Experiments tending to show the great sensitiveness of the telephone and the possibility of telephoning, under special circumstances, over considerable distances without a direct intervening wire are certainly highly interesting, have no doubt a great scientific value and show the possibility of practical applications where extraordinary situations would justify extraordinary measures and expense. But they by no means point to the possibility of any such practical development as the ordinary layman would imagine to be in sight if he read of wireless telephony. This, however, does not prevent inventors of the Orling-Armstrong class from boldly announcing wireless telephony as part of their system.

The Working of the System

The following description supplied to newspaper reporters at a recent demonstration of the system gives an idea of the scientific attainments of these inventors, who so far have not apparently shown their system to the representative of any technical journal: "Whereas, the Marconi system depends on magnetic impulses through the ether, the messages, sent by the Orling-Armstrong system depend upon something of the nature of conduction in the earth's crust. The inventors make two connections with the earth at the transmitting end, distant say 40 feet apart. At the receiving end, which may be a mile or more away, two similar connections are made to earth. A high tension discharge is then sent cross the earth at the transmitting end, and at the same moment a low tension current is also switched across the same earth. The result seems to be that owing to this combination of a high potential discharge and low tension current, the current effect is caused to spread very widely, and a portion of the current will find its way across the wire connecting the earth points at the receiving end. This is the main principle underlying all the experiments shown."

The Glowing Description

For a "main principle" this seems pretty good. We almost seem to have gone back to the old days when they spoke of the electric fluid, as the "combination of high potential discharge with low tension current"; sounds much like a mixture—say, of oil and treacle. However, this is nothing to the Orling-Armstrong "field telephone." "Conversation over several hundred yards was easy. The earth plates in this case were ordinary garden spades, the telephone was quite small, and the rest of the apparatus could easily be carried on the back. The inventors state that they can tune the telephone so that when one person is talking to another, their conversation cannot be heard by a third person, although his telephone is connected to the same line, namely another earth. To telephone from a house to the stables, all that is necessary is to connect up to the gas and water mains in the house and to the railings and sink in the stable yard." Presumably, if another telephone were connected to the kitchen range and the scullery sink in the house, and a fourth to the mangers and to the stove pipe in the stables, with properly tuned telephones, the kitchen maids could have a private line to the grooms while the master was talking to the coachman. As THE AMERICAN TELEPHONE JOURNAL has pointed out before, there is no particular novelty in the gas pipe variety of "wireless telephony," but with "tuned" telephones the possibilities are certainly increased. If now a telephone could be made capable of adjustment to any tune, universal telephony by means of the crust of the earth is in sight.

N. T. C. and Municipal Competition

The *London Electrician* publishes a long article descriptive of the new work done at Glasgow by the National Telephone Company in order to cope with the active competition of the municipal system. The article states that after fruitless negotiations with the corporation of the city of Glasgow for underground rights of way, the National Company finally decided to proceed with the reconstruction of their whole system throughout the Glasgow telephone area without those facilities. The area covers some 143 square miles and it appears that in some parts of it there are separate municipalities from which the company was able to get underground rights of way. In the central part, however, Glasgow proper, the reconstruction has had to be done by means of aerial cable and some 20,000 miles of wire was put up in this way. The whole system has been made metallic circuit, and the call-wire method of operating abandoned; the municipal exchange on the other hand adopted the call-wire and was thus hopelessly out of date before it was started. The National Company has some 12,000 subscribers in the Glasgow area, with a large number waiting to be joined up. The picture of what is presumably the main exchange shows a fine and spacious operating room with a rather antique-looking flat switchboard.

N. T. C's. New System

The new system of working adopted by the National Company at Glasgow is described as an ingenious adaptation of the "ringing-through" principle to the central battery signalling system, used in connection with multiple switchboards fitted with branching jacks. From the description of the system and the accompanying diagrams, we judge that the method of operating is for the subscriber to press a key to signal the exchange and, when connected, to ring his correspondent by means of his magneto generator; the line signal is a lamp and a single supervisory lamp gives the disconnection signal, the subscriber pressing the same key as for calling. The "ringing-through" method of operating seems to find a good deal of favor in England, but it would hardly commend itself to American telephone engineers, and presumably was adopted in this instance as a compromise by which the advantages of lamp signalling were obtained without the expense and risk of complete central energy working with a line plant consisting largely of overhead work.

The opposition system in Glasgow continues to grow and is feeling very proud of itself. At a recent meeting of the Town Council, the chairman of the Telephone Committee said that the municipal system had just attained its third birthday—meaning apparently that it had been in operation two full years. On the opening day there were 19 subscribers connected and 38 messages passed. In England, and probably in Scotland, it is customary in telephone statistics to count one telephone connection as two messages, on the assumption that each connection means a message and its reply. On this basis it appears that each subscriber to the Glasgow municipal system was good enough to make one call on that happy first birthday. A year later the subscribers had grown to 4,524, and messages were passing "at the rate of nearly 10,000,000 per annum," which, being translated, means an average daily use per subscriber of about 4 calls. On the said third birthday there were 15 exchanges in operation, serving 8,504 instruments, and the estimated traffic was put at the rate of 30,000,000 a year. Dividing this by 300 and again by 2, we get a daily traffic of about 50,000 calls or an average of about 6 calls daily per subscriber.

The Brighton municipal system is making preliminary flourishes and announcing rates for extra equipment at all sorts of odd sums that smack of the bargain counter. An extension station is to be $4.12 for a wall set and $5.08 for a desk set, while private line is 93 cents for 110 yards or fraction thereof, equivalent to $14.88 a mile. What is evidently intended to be a most alluring "card" is the statement that "every effort will be made to give subscribers any particular telephone number they may prefer." Forever?

HOME MADE BRACKETS

By Terrell W. Croft.

When wires run to a building in a conspicuous place, it is desirable that they present a neater appearance than the ordinary method of nailing on wooden brackets can give. Iron brackets can be bought from the supply companies, but their cost may be prohibitive, or possibly there are none on hand. Following the idea here presented almost any type of an iron fixture can be quickly and cheaply made.

A piece of strap iron is bent into the desired shape, as shown in Fig. 1, screw holes drilled, and its end placed in an insulator. Around the iron, plaster of Paris is poured, mixed with water to the consistency of thick cream. When the plaster sets the fixture is ready for use.

The type shown is only one of the many which may be made. By cutting in half at the middle screw hole a single bracket would be formed. By properly bending the strap iron a double bracket with its two insulators in a horizontal line could be shaped. Special fixtures to be placed on building corners or bolted to steel work can easily be arranged.

Strap iron is best used if a forge is not available, as it can be bent while cold by using a vise and hammer. The screw holes may be drilled with a breast drill. Any size of strap iron that will enter the hole in the insulator will do, provided it is stiff enough. Judgment must be exercised, as in no two cases will the strain on the bracket be the same. Round iron is better than strap, as it is stiffer, but for most sizes it would be necessary to heat it before bending. If round iron is used it should be flattened at the points where the screw holes are drilled. This may be done with a hammer while hot. The whole length of iron below the first screw hole may be flattened so that the fixture will lie closely to its support.

Screw holes are best placed directly in the line along which the strain is to be. If this is done there will be no bending action at the point where the screw hole is drilled, where the iron is weakest. This is illustrated in the figure. The bottom screw hole being placed directly back of the groove in the insulator, thus, when a strain is brought on the insulator, there will be a tendency to pull the screw from the wood, but there will be no tendency to bend. In the bracket shown it would be impossible, without altering its construction, to so place the upper screw hole that it would fulfill the above conditions.

When a screw comes directly behind an insulator some trouble may be experienced in turning it into place, the insulator being in the way of the screwdriver. This can be avoided by first turning the screws into the wood as far as they will be required to go, before the bracket is in place, using it as a templet to determine their positions. The screws can now be removed, the bracket replaced, the screws reinserted and turned until tight.

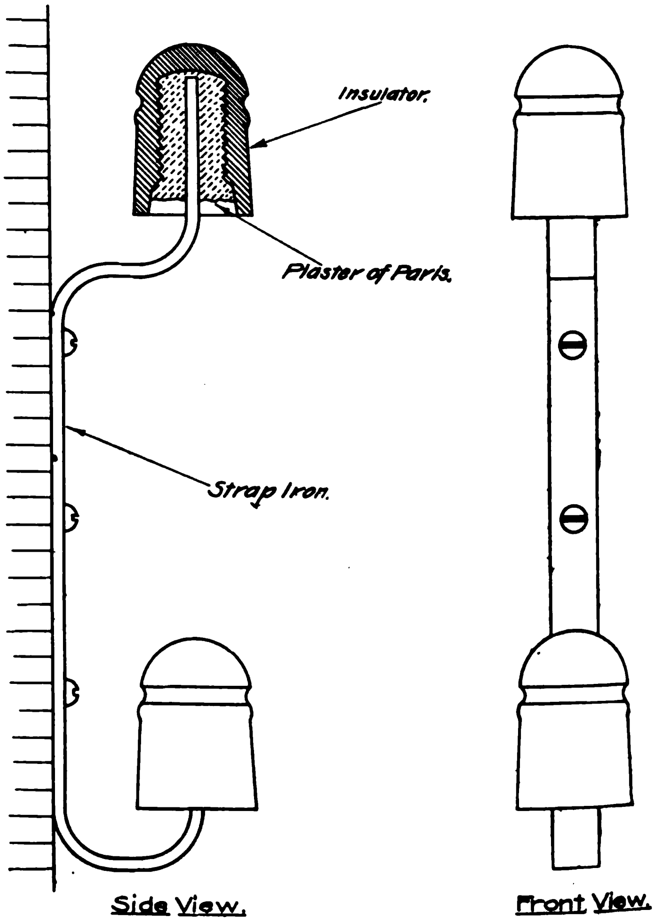


FIG. 1.—TWO VIEWS OF HOME-MADE BRACKET.

The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

COMPREHENSIVE CASE RELATIVE TO CONDEMNATION PROCEEDINGS.

THE case of the St. Louis & San Francisco Railroad Company *v.* the Southwestern Telephone & Telegraph Company, recently decided by the Circuit Court of Appeals of the United States, Eighth Circuit, is quite remarkable for its comprehensiveness and the number of questions passed upon. No less than eight rulings were made by the court in the decision. On March 31, 1902, the telephone company filed a petition in the Circuit Court of Sebastian County, Arkansas, to condemn an easement for the poles and wires of a telephone and telegraph business along the railroad company's right of way between Fort Smith and Huntington, Arkansas, a distance of three miles. The judge of the court made an order in accordance with the laws of Arkansas that upon the deposit of fifteen hundred dollars the telephone company might enter upon the right of way, erect its poles and string its wires. This proceeding for condemnation was removed to the United States Circuit Court for the Western District of Arkansas. The railroad company then filed a bill in equity to perpetually enjoin the telephone company from entering upon the right of way or using it for its telephone business. To this bill the telephone company interposed a general demurrer, a proceeding that amounted to asking that the bill of complaint be dismissed because it showed on its face that the complainant was not entitled to relief. A decree was made dismissing the bill. This appeal assailed this decree. The higher court partly sustained and partly overruled the demurrer.

The first contention of the railroad company was that the telephone company never became a corporation because its president and directors neglected to write the words "president," and "directors" respectively after their signatures in the copy of the articles of incorporation filed with the secretary of state; that they were therefore signed merely as individuals, whereas the statutes of Arkansas provided that they should be signed by the officers of the corporation. The court held that, the signers being actually the president and directors when the articles were filed, it was that fact and not the appearance of that fact that gave validity to the incorporation.

Secondly, the railroad company insisted that the defendant had no power to condemn an easement along its right of way, because the defendant did not survey and locate its line before instituting its proceeding, as provided by the statutes of the state. To this the court said that the only purpose of the survey and location mentioned in the statute was to secure a description of the property to be affected and to give fair notice to the owner of the extent of the right which the condemning company sought. No survey was necessary in the present case because the right of way of the railroad company and the railroad itself furnished the data for a substantial description and location of the right of way sought. "The law never requires the performance of a useless act."

Again it was insisted that the telephone company had no power to condemn an easement for the line it was seeking to build because such line was not mentioned in its articles. But, said the court, the statute under which the company was organized did not require it to state in its articles of incorporation the lines it would build or the business it would transact. When it stated that its purpose was to transact a general telephone and telegraph business, it fully complied with the law and acquired ample authority to condemn easements and construct telephone lines between any of the cities and towns of the state.

Next the railroad company alleged that the telephone company had not complied with the statute making a failure to agree with the owner of the property a condition precedent to the right to condemn any interest therein. The telephone company alleged, however, that it had made an honest attempt to secure the right of way desired from the railroad company before beginning the condemnation proceedings. This fact, the court held, was one that should be disproved in the original condemnation proceedings, if untrue. Its untruth formed no basis for an independent suit in equity to enjoin those proceedings.

The sixth contention of the railroad company was that the condemnation proceedings were void because the act under which they were taken was in violation of the Constitution of Arkansas. The provision to which the act is said to be obnoxious reads:

> "No law shall be revived, amended, or the provisions thereof extended or conferred, by reference to its title only, but so much thereof as is revived, amended, extended, or conferred, shall be re-enacted and published at length."

This provision, the court held, had no reference to legislation which simply affects remedies and methods of proceedure, such as condemnation proceedings.

Seventh, the railroad company alleged that there was no public necessity for the construction of this line of telephone upon its right of way, or for the taking of its right of way for that purpose, and that a public necessity must exist before property could be taken in the exercise of the power of eminent domain. But the State of Arkansas had expressly empowered telephone companies to construct and operate lines along the railroads within the state, and this, the court decided, foreclosed the question of public necessity.

The last contention of the railroad company was the only one that was sustained by the court. This contention was that the railroad ran some distance through the Indian Territory, and that, the telephone company not being incorporated in that territory, it had no right to exercise the right of eminent domain therein. The court therefor restrained the telephone company from entering upon the premises of the railroad company in the Indian Territory, but refused to restrain it from continuing its condemnation proceedings in the State of Arkansas.—*St. Louis & San Francisco Railroad Company v. Southwestern Telephone & Telegraph Company, 121 F. 276.*

TELEPHONE TROUBLES IN IOWA.

JUDGE HOUSE, of Davenport, Ia., has granted a temporary injunction in the case of the *Johnson Telephone Company v. The Union Electric Telephone & Telegraph Company,* restraining the latter company from severing its connection with the former and cutting off its service. When the Johnson Company filed the petition, the Union Company heard what was being done, and by quick work succeeded in disconnecting the wires before the petition reached the judge's hands. These wires the Union Company is now ordered to replace, as they were before the trouble began, and it is also commanded to give the Johnson Company service until the matter is finally settled.

Patents

IMPROVED COMMON BATTERY CIRCUIT.

Kempster B. Miller, Chicago, patents (No. 726,964) and assigns to Kellogg Switchboard and Supply Company, an improved common battery circuit. This invention is illustrated in Figs. 1 and 2, and contains the following essential features. which differ from other common battery circuits: The cut off relay is omitted; the line signal *c* is controlled by a break contact jack 4. When the subscriber removes the receiver from the hook, the signal *c* is actuated, and as soon as the plug is inserted, the contacts a^4 and a^5 are opened and the signal cut off. Instead of one battery at the central station, Mr. Miller employs two batteries *g* and g^1, Fig. 2. The supervisory signals are controlled by a differentially wound relay *f* that is supplied by currents flowing in different directions by the two batteries. The operation of the system is as follows:

Supposing subscriber *A* desires to converse with subscriber *B*, he removes his telephone-receiver from the hook, thus closing

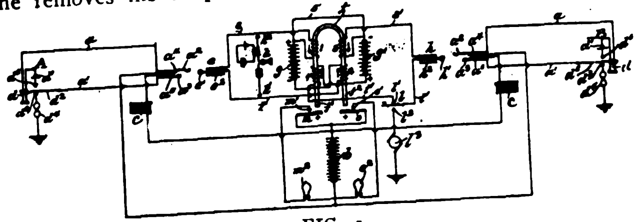


FIG. 1.

circuit of battery *b* through annunciator *c* to contact a^5, spring a^3, limb a^1, hook d^2, contact d^5, limb *a*, spring a^2, contact a^4, back to the battery *b*. The individual annunciator *c* is thus actuated, thereby attracting the attention of the operator at the central station. The operator thereupon lifts answering plug *e* and inserts the same in the spring-jack belonging to subscriber *A*. The springs a^2 and a^3 are lifted from their contacts a^4 and a^5, respectively, and the individual annunciator *c* is thus disconnected from the telephone-circuit. As soon as the plug *e* is inserted, the circuit of battery *g* is closed through windings 1 and 2, and through the two limbs of the telephone line, since the subscriber's receiver is removed from the hook, the current is thus caused to traverse windings 1 and 2 in such a direction as to impart to pole f^2 a negative polarity, while imparting a positive polarity to pole f^1. The armature of spring *o* is thus attracted, thereby closing the circuit of battery *b* through spring *o*, contact o^1, and lamp o^2,

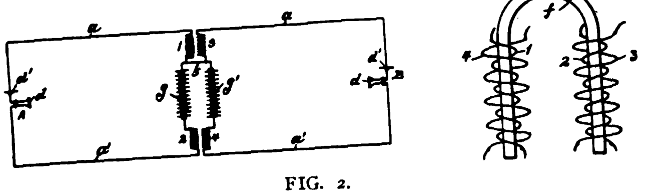


FIG. 2.

thereby lighting the lamp. The operator now connects her telephone set in circuit in the usual manner and receives the number of the called subscriber. Learning that subscriber *B* is desired, she lifts the calling plug *h*, which is the companion to the answering plug *e*, and inserts the same in the spring-jack belonging to subscriber *B*. Then she depresses the ringing key, thereby sending calling-current from the generator 13 over strand t^1 and limb a^1 and to ground through the bell of subscriber *B*. When subscriber *B* responds and removes his telephone from the hook, the circuit of battery g^1 is closed through windings 3 and 4, which tend to polarize the core *f* and in a direction opposite to that in which the windings 1 and 2 tend to polarize the same, and the core is thus rendered neutral and inert. The armature of spring *o* is therefore released to open the circuit through lamp o^2, and the lamp o^2 is extinguished to signify to the operator that the called subscriber has answered and that the parties are in conversation.

The circuit during conversation is shown in Fig. 2. When subscriber *A* is talking, his microphone serves to vary the resistance of the circuit of battery *g*, while when subscriber *B* is talking, the resistance of the circuit of battery g^1 is varied.

When the parties have completed their conversation, they hang up their telephone-receivers, thereby actuating the supervisory signals to convey the clearing out signal to the operator. If one of the subscribers alone hangs up his telephone, one of the lamps alone will be lighted, while if both subscribers hang up their telephones, both lamps will be lighted. Thus, if subscriber *A* hangs up his telephone, while subscriber *B* does not, the circuit of battery g^1 will alone be closed, and the core *f* will be polarized with a negative polarity at f^1, and positive polarity at f^2, thereby lighting the lamp m^2 to signify to the operator that the subscriber *A* has completed conversation. Likewise, if subscriber *B* hangs up his telephone, while subscriber *A* does not, the battery g^1 will alone be included in circuit, and the windings 1 and 2 will produce a negative polarity at f^2 and a positive polarity at f^1, thereby lighting o^2. If both subscribers hang up their telephones, then circuit will be closed from the ground at sub-station *A*, through the bell d^4, over limb a^1 and strand *t*, through winding 2, battery *g*, conductor 5, battery g^1, winding 4, strand t^1, and limb a^1 of subscriber *B*, through his bell to ground. The windings 2 and 4 are thus energized, and as the windings are upon opposite legs of the core *f* and tend to polarize the core oppositely, the result will be that poles f^1 and f^2 will be of negative polarity, while a consequent pole will be formed at the bend of the core. The armatures of levers *m* and *o* will therefore be attracted to close circuit through the supervisory lamps m^2 and o^2.

SELECTIVE TELEPHONE SYSTEM.

Chas. B. Smith, New York, N. Y., patents (No. 727,701) a system for sending selective signals for party lines. To understand Mr. Smith's invention completely, it is necessary to examine the original patent, which contains 27 pages of descriptive matter, and is therefore too long to condense into an abstract. The salient features, however, may be understood by

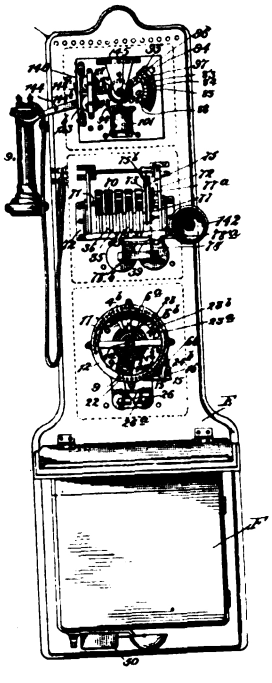


FIG. 3.

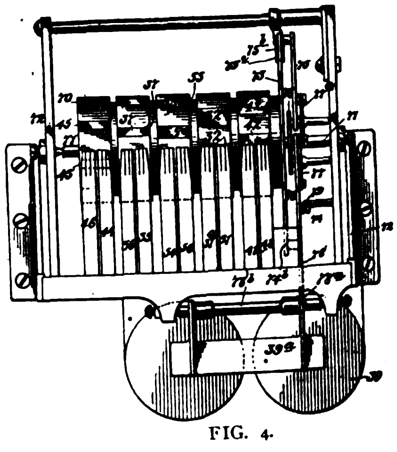


FIG. 4.

referring to Figs. 3 and 4. Each sub-station is provided with a complicated selector system, shown in Fig. 4, that consists of a commutator, carrying a number of fingers adapted to make contact at different points, and of a circular disc provided with conducting and insulating contact spaces. By this means the inventor is able to transmit selective signals over the lines which operate step by step mechanisms at the various sub-stations, and any particular bell may be rung to the exclusion of all others.

TELEPHONE SELECTIVE SIGNAL SYSTEM.

William D. Watkins, San Jose, Cal., patents (No. 728,147), and assigns to Watkins Manufacturing Company, a system of selective signals for party lines. This device is another example of the application of the step by step mechanism, and is intended to be applied to any ordinary bell without changing construction. The mechanism, while simple and compact, is complicated, and for a full description the reader is referred to the original patent. In outline the invention is illustrated in Fig. 5. A supplementary frame 11 is secured to the ordinary frame supporting the bell magnets. This frame carries an additional armature 25. This armature is arranged to operate a lever 54 that actuates a toothed wheel 40. This toothed wheel is employed to close at the proper time the circuit to the bell magnets. To call any given station, the operator sends impulses over the line; these impulses actuate lever 54 and turn the wheel 40 to its proper notch, and under these circumstances the operator can signal any given station without ringing others.

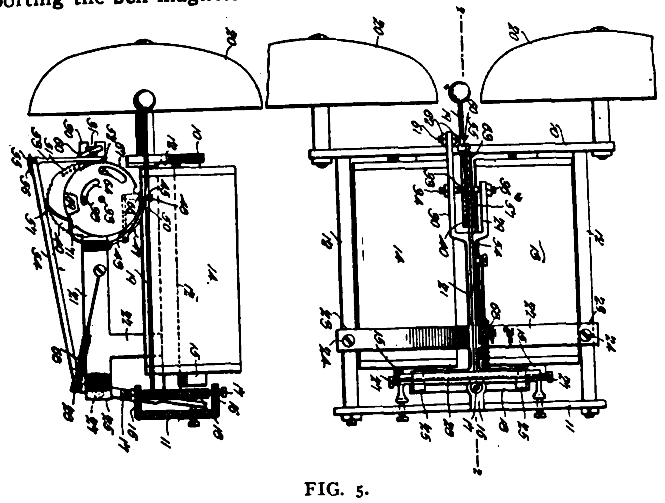
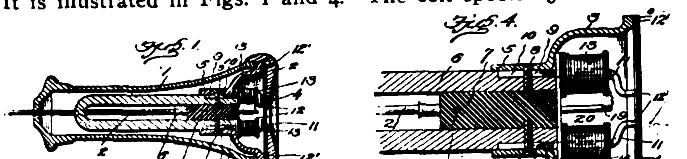


FIG. 5.

IMPROVEMENT IN TELEPHONE RECEIVERS.

George E. Wheeler, Burlington, Iowa, patents (No. 728,342) and assigns to Modern Electric Company an improvement for telephone receivers. This invention designs to provide a receiver which shall be simple, durable and inexpensive of construction, and which shall provide the best possible facilities for adjustment. It is illustrated in Figs. 1 and 4. The coil spools 13 are wound upon pole pieces 12, which are placed upon a facing plate and thus the spools are rigidly adjusted with reference to each other. The pole pieces are placed in slots cut in the outside of the magnet 6 and secured by two screws, 8. Between the poles of the magnet is a block, 7. The diaphragm is supported by a cup, 3, which is held to the magnets by means of the screws, 8; thus the entire acoustic and magnetic system of the receiver is mounted independently of the case and is rendered easy of adjustment, and, when adjusted, is permanent.

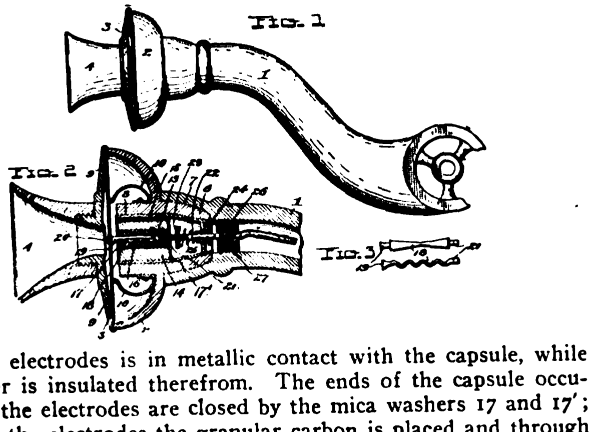


TELEPHONE-PAD.

Courtney Van Riper, Washington, D. C., patents (No. 726,482) an improved paper pad for telephone use. The object of this invention is to provide a desirable form of making memoranda from telephone calls. The pad is made in the form of a roll on an axle, supported by two adjustable uprights from a desk. The paper can be rolled off on this desk. An advertisement may be printed on the opposite side of the paper, the side which faces the telephone user.

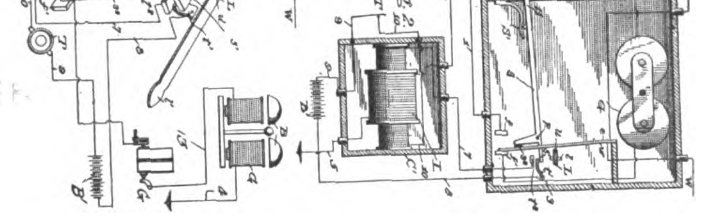
TELEPHONE TRANSMITTER.

George E. Wheeler, Burlington, Iowa, patents (No. 728,344) and assigns to the Modern Electric Company, of Burlington, Ia., an improved telephone transmitter. This invention is shown in Figs. 1 and 2. Fig. 1 is a front elevation of the transmitter and Fig. 2 a section. The invention is aimed to provide electrodes, which can be arranged to exclude the diaphragm from their circuit to produce a transmitter of the utmost delicacy and which shall reproduce sound waves without distortion, to avoid packing and to provide an instrument easy of repair. The essence of the invention consists in the method of arranging the electrodes. The inventor provides what he calls a cartridge, which is a metallic capsule, shown in section in Fig. 2, which can be slipped inside recess 6 formed in the rear of the transmitter shell 2, Fig. 1. This capsule contains two electrodes, 13 and 14. These electrodes may be of carbon or any other material. One of these electrodes is in metallic contact with the capsule, while the other is insulated therefrom. The ends of the capsule occupied by the electrodes are closed by the mica washers 17 and 17'; between the electrodes the granular carbon is placed and through the center of the capsule a rod, 18, passes, which at one end is secured to the diaphragm and the other end to the spiral spring, 25, which serves to adjust the tension upon this rod. The object of the rod is to act as an agitator and keep the carbon constantly stirred up and in good talking condition.



PARTY LINE TELEPHONE SYSTEM.

Ernest Umdenstock, Reading, Kans., patents (No. 728,785) a party line system. This invention relates to improvements in party line systems where a number of telephones are arranged in series upon a common line, and aims to provide a method whereby any subscriber can call any other one and hold conversation to the exclusion of the others. It is illustrated in Figs. 1 to 4 inclusive. Fig. 1 is a front elevation, Fig. 2 a section and Fig. 3 an isomatic projection of the apparatus, while Fig. 4 shows one side of the line with the instruments in series. Each instrument is supplied with the ordinary hook switch *S*, in Fig. 3. It also has two springs, *e* and *w*, to which the line wires *E* and *W* are attached. There are also two contacts, f and f^1. When the receiver is on hook switch *S* the springs *e* and *w* are by means of the hook switch pressed against the spring f^1. Under these circumstances the line current can enter over the wire *W* through the spring *w* to the ringing generator *G* and the bell *B* to ground. Thus any station can be called, when the receiver is removed from the hook switch the springs *e* and *w* move against the bar *f* and complete the talking circuit. The lever *L* is used to press either the springs *e* or *w* away from the contact f^1. By this means each subscriber is enabled to signal to the instruments at either side of him at pleasure. Should an intermediate station attempt to listen in, the act of removing the receiver from the switch hook would cut out of circuit one of the line wires and interrupt the conversation that is being held.



The Week's Messages.

FINANCIAL.

INDIANAPOLIS, IND.—The Sugar Creek Telephone Company of Hancock County has notified the Secretary of State of a change of name to New Palestine Telephone Company, and an increase in capital stock to $3,000.

TERRE HAUTE, IND.—A mortgage has been filed by the Citizens' Telephone Company to the United States Trust Company as trustee to secure $200,000 5 per cent. bonds due January 1, 1923. A mortgage for $100,000 was cancelled of record April 25. The company's capital stock is $150,000, and the officers are: President, W. P. Ijams; vice-president, F. B. Smith; secretary and treasurer, G. A. Couzman; general manager, C. R. Duffin.

BENZONIA, MICH.—The Benzie County Telephone Company has increased its capital stock from $20,000 to $50,000.

UTICA, N. Y.—The Utica Home Telephone Company has been returned its certified check of $3,000, as it has more than the required number of telephones in operation.

CLEVELAND, O.—It was announced at the office of the Everett-Moore Syndicate that the interest on the United States and Cuyahoga Telephone bonds, due July 1, will be paid promptly on that date and that the properties are in such shape that never again will there be any deferred interest on any of the telephone bonds.

SUMTER, S. C.—The Sumter Telephone Company has been reorganized and the capital stock increased to $10,000. The following officers have been elected: President, S. C. Baker; vice-president, G. A. Lemmon; secretary and treasurer, H. J. Harby; directors, S. C. Baker, G. A. Lemmon, H. J. Harby, R. I. Manning, I. C. Strauss and Marion Moise.

FRANCHISES.

CHICAGO, ILL.—The United Telephone and Telegraph Company, now operating in Hyde Park, wishes to extend its wires in the district bounded by Fullerton avenue, Western avenue, Twenty-second street and the lake, and in the stockyards.

CARLISLE, IND.—Representatives of the Home Telephone Company of Vincennes, Ind., were here asking for a franchise to extend their lines here and establish a toll station.

BROCKTON, MASS.—William E. Cadmus, of Elyria, O., has asked for a franchise for the establishment of a home telephone company.

METUCHEN, N. J.—The Central New Jersey Telephone Company will ask for a franchise here.

NEW BRUNSWICK, N. J.—The Central New Jersey Telephone Company has been granted a franchise here.

SALEM, N. J.—The Interstate Telephone Company has requested of the Board of Freeholders the right to erect poles on the county property on Market street.

SIDNEY, N. Y.—The Riverside Telephone Company, operating between Sidney and Bainbridge, has asked for a franchise here.

NORWOOD, O.—The application for a franchise to string telephone wires along Duck Creek by the Fitzsimmons Telephone Company was referred to the committee on streets and grades, telephones and telegraphs.

COVENTRY, R. I.—The Coventry Telephone Company has been granted permission to erect poles on certain highways under the direction of the highway overseer of each district.

MEMPHIS, TENN.—The Memphis Telephone Company has asked the mayor and city council of Collierville for a 99-year franchise, and if it is granted, will begin at once the erection of its poles and wires, looking to the establishment of an exchange in that city.

WYTHEVILLE, VA.—L. D. Calfee, general manager of the old Wytheville Telephone Company, has notified the town council that he intends to bid on the mutual telephone franchise which the town offers for sale.

WAUSAUKEE, WIS.—The Wausaukee Telephone Company has been granted a franchise by the Marinette city council.

ELECTIONS.

ST. JOHN, N. B., CAN.—At the annual meeting of the St. Martin's Telephone Company, held recently, a 10 per cent. dividend was declared, Trueman, vice-president; W. M. Jarvis, secretary.

CANTON, ILL.—The stockholders of the Canton Home Telephone Company have elected these directors: M. J. Gorman, Eugene Smith, E. A. Heald, G. W. Chandler, W. D. Plattenburg, F. L. Bills, T. C. Fleming.

IONA, MO.—The Lincoln and Iona Telephone Company has elected R. H. Berry, president; Lewis Schnabel, Iona, vice-president; Dr. W. G. Jones, secretary, and A. W. Lay, treasurer.

PLATTSMOUTH, NEB.—The Plattsmouth Telephone Company held its annual meeting in this city, and the following officers were elected: President, Tom E. Parmele; vice-president, C. C. Parmele; treasurer and general manager, T. H. Pollock; secretary, J. N. Wise. The usual 10 per cent. dividend was declared on the stock. The company will at once proceed to complete its toll lines from Havelock to Lincoln and connect with the lines of an Independent company, which are now being built in that city.

CRANBURY, N. J.—The Farmers' and Traders' Telephone Company has elected the following officers: President, E. C. Mount; vice-president, H. M. Jeffers; secretary and treasurer, Walter Grover.

BUFFALO, N. Y.—The Knowles & Tillman Telephone Transmitter Manufacturing Company stockholders met at the office of Herbert P. Bissell recently and elected the following officers: President, Byron J. Tillman; vice-president, Albert V. Tillman; treasurer, W. J. Knowles; secretary, Albert V. Tillman.

BELOIT, WIS.—At the annual meeting of the stockholders of the Beloit Telephone Company the following directors were elected: D. H. Pollock, W. H. Grinnell, Rev. M. J. Ward, C. A. Gault and Charles Franz. The directors chose the following officers: President, C. A. Gault; vice-president, Rev. M. J. Ward; secretary and treasurer, D. H. Pollock.

COMPETITION

NEWBURGH, N. Y.—The Newburgh common council has ordered the Colonial Telephone Company's service substituted for that of the Hudson River Telephone Company in all the fire houses in the city.

COMBINATIONS.

NEW SHARON, ME.—The New Sharon and Norridgewock Telephone Company has purchased all the lines and fittings of the former Norridgewock and Fairfield Company as far as the Fairfield line, and the two services will be united in one switchboard, which for the present will be located in Norridgewock.

CUMBERLAND, MD.—The Western Maryland Telephone Company has secured control of the system of the Gordon Telephone Company, which covers Piedmont, Keyser, Westernport, Petersburg, Maysville, Bloomington and other towns in Maryland and West Virginia.

CANTON, MO.—The Lewis County Telephone Company has purchased the La Grange Telephone Exchange and the local exchanges at Maywood, Ewing and several other places in the county. The Lewis County Company also intends building a new line from Durham, six miles, with about six farmer subscribers.

HAMILTON, MO.—F. L. Tool and W. J. Clark, owners of the Hamilton telephone plant, have sold a one-half interest in the system to G. A. Barnes, of Brookfield. The company will overhaul, rebuild, repair and otherwise improve the plant in this city.

MIDDLETOWN, N. Y.—The Farmers' Union Telephone Company, of Sussex County, has acquired control of the Mt. Salem Telephone Company.

PERSONAL.

DAVENPORT, IA.—Manager Arthur Slater, of the Union Telephone and Electric Company, has tendered his resignation to the company, to take effect on June 1.

THE WEEK'S MESSAGES—Continued.

KINSLEY, KAN.—Geo. W. Watson, manager of the Kinsley Telephone Company, was seriously injured in a runaway some time ago.

MINNEAPOLIS, MINN.—C. H. Judson, general superintendent of the Twin City Telephone Company, will resign his position here about July 1 and will remove to Kansas City, Mo., where he will be general manager of the Kansas City Home Telephone Company.

JOHNSTOWN, N. Y.—G. K. Gee, who has been at Johnstown installing the new switchboard in the Glen telephone exchange, has gone to Seattle, Wash., where he has secured a position as superintendent of switchboards with the Independent Telephone Company.

UNDERGROUND.

MONTREAL, QUE., CAN.—The aldermen are considering a proposition to build a conduit system, leasing ducts to the various telephone, telegraph and electric companies.

JACKSON, MICH.—Alderman Carroll has introduced an ordinance to amend the telephone ordinance, under which the Citizens' Telephone Company is now doing business, relating to the putting of wires under ground.

OSWEGO, N. Y.—The Ontario Telephone Company is discussing the advisability of placing its cables underground. The Empire Telephone Company may also place its wires underground.

SALT LAKE CITY, UTAH.—The Home Independent Telephone Company has assigned to the Stromberg-Carlson Company, of Rochester, the matter of letting a contract for the 300,000 feet of conduit, and Secretary Satterlee believes the order will be filled by some Kansas City concern.

MISCELLANEOUS.

PRESCOTT, ARIZ.—The Mexican officials in Sonora have refused to longer continue the franchise of the telephone company that has been operating a line to Cananea from Naco.

LOS ANGELES, CAL.—The Home Telephone Company now has about 5,000 telephones in use, and is charging for service. The service is very good and subscribers are paying willingly.

MUNCIE, IND.—The strike at the Delaware and Madison Counties Telephone Company has been amicably adjusted through J. F. Edwards, of Alexandria, chosen as arbiter. The linemen's wages were increased from $2.50 to $2.75 a day, that of inspectors from $60 to $65 a month.

DIGHTON, KAN.—The Dighton Telephone Company has increased its subscription list to thirty-two, with several more to be added to the list in the near future.

WINFIELD, KAN.—The Winfield Telephone Company has made connections with Cedarville by way of Dexter.

ROME, N. Y.—The Rome Home Telephone Company has issued its new list of subscribers, containing 900 names.

DUNKIRK, O.—A fire which wiped out the business section of the town destroyed the plant of the Dunkirk Telephone Company.

WOODSTOCK, O.—The Mechanicsburg Telephone Company has opened its new exchange here with eighty-five telephones in operation.

DENISON, TEX.—The Grayson County Telephone Company has introduced between Denison and Sherman a successful phantom circuit, which is the first ever tried in the South.

New Construction in the Field

POMONA, CAL.—The Pomona Valley Telephone Union is ready to commence stringing wires on its poles now set about the valley. Much of the equipment for the new switchboard to be installed in the company's central office here has been received.

MONTREAL, CAN.—The Merchants' Telephone Company, most of the stock of which is now controlled by American capitalists, has decided that its field shall not be confined to Montreal, but that as soon as the necessary arrangements can be made, connections will be established throughout all the provinces of the Dominion. A leading director of the Merchants' Company said: "For some time the directors of the newly organized company have had the matter under consideration. By our present charter we have not the right to go outside of the Province of Quebec. An application is before the Dominion Government on behalf of a number of American capitalists, belonging principally to Philadelphia, for a charter for a telephone company with rights throughout Canada. The capital of this company is to be $30,000,000. The capitalists interested in the company seeking to obtain the charter tried to buy out the Merchants' Company before the controlling interest in it was secured by the present holders."

VICTORIA, B. C., CAN.—The New Westminster and Burrard Inlet Telephone Company has purchased a new switchboard for the Victoria office. It is of the "central energy" type, and will accommodate 1,500 subscribers and is capable of extension to a maximum capacity of 5,000 subscribers.

WETASKIWIN, N. W. T., CAN.—The municipal council of Wetaskiwin has passed a resolution in favor of establishing a system of telephones and fire alarms to be owned exclusively by the town.

CARLINVILLE, ILL.—W. Roy McCann, of St. Louis, assistant secretary of the Kinlock Telephone Company, has closed a contract with the Macoupin Telephone Company, of Macoupin county, for a joint exchange, whereby they are to build two metallic circuit lines from Alton to Springfield through this city.

COLCHESTER, ILL.—The Illinois Western Telephone Company is making extensive repairs on both lines and inside equipment. W. I. Savage is in charge of the work.

EFFINGHAM, ILL.—The Wabash Valley Telephone Company has leased rooms for ten years to be used for the exchange which they propose to establish in this city.

OTTAWA, ILL.—The Home Telephone Company is stringing the cable to South Ottawa.

PEORIA, ILL.—The Interstate Telephone and Telegraph Company will erect a new building here.

STREATOR, ILL.—Manager Schuler, of the Streator Independent Telephone Company, has received permission to spend about $30,000 during the coming year in extending or improving the lines of the company in this vicinity. A copper line will be built between Streator and Aurora, and a toll line from this city to Ransom.

WATSEKA, ILL.—The Donovan Telephone Company has extended its line west of town several miles.

EAST MT. CARMEL, IND.—The Independent Telephone Company of Princeton, Ind., has extended its lines to this place. It will connect with the Mt. Carmel, Ill., Independent Company, of that place.

EVANSVILLE, IND.—The plant of the Evansville Municipal Telephone Company will not be built by a construction company, as has been talked of for some time. Instead, it will be constructed by the telephone company itself.

GREENSBURG, IND.—Owing to the large increase in the number of instruments in use, the Decatur County Independent Telephone Company has put in an exchange at St. Paul, Ind.

CAMBRIDGE, IA.—The Cambridge Independent Telephone Company will erect a toll line south to Elkhart. Two rural lines will also be built soon. The directors have decided to purchase a new switchboard.

CHEQUEST, IA.—L. C. Ludwig, J. W. Brewer, Clay Baird and S. Baird have been in Chequest negotiating with the Chequest Farmers' Telephone Company for an extension of that line into their neighborhood.

RICEVILLE, IA.—The Northern Iowa Telephone Company is building lines out of Riceville for the convenience of farmers. This company will also build a full metallic line to Cresco.

DODGE CITY, KAN.—A force of men are at work here for the Larned Telephone Company, putting up several hundred feet of paper insulated cable and getting ready to install more new stations. The exchange is rapidly growing under the management of the Larned Company, which purchased it last summer.

LARNED, KAN.—C. A. Knight, a Stromberg-Carlson expert, has just completed the installation of a new section to the Larned Telephone Company's switchboard.

MEADE, KAN.—A telephone exchange will be built at Meade in the near future by local capital.

STAFFORD, KAN.—Larabee Bros., owners of the local telephone system, will in the near future be obliged to install a new switchboard.

TORONTO, KAN.—The Toronto Telephone Company has the material on the way for the new plant it will install here.

WESTMORELAND, KAN.—The Vermillion Valley Telephone Company has completed its line. It is expected that many new telephones will be added soon and the service greatly extended.

BOWLING GREEN, KY.—The Independent Telephone Company has about completed its plant. The new switchboard has been received and has been put in place. It has a capacity of 3,200 telephones. So far the company has contracted to put in telephones for 700 subscribers.

HARLAN, KY.—The Harlan Telephone Company has constructed a line from Cawood and is now building a line to Hagan, Va. It is also contemplating a line to Pineville, with long distance connections with Louisville and other points.

SHREWSBURY, KY.—The Shrewsbury Telephone Company, the principal stockholders being Chas. W. Clagett, Robert Dinwiddle and Milton

THE WEEK'S MESSAGES—Concluded

B. Lile, have arranged to build a telephone line from Shrewsbury to Leitchfield.

FAYETTE CORNER, ME.—The Crosby Telephone Company will soon extend its line from Fayette Corner to East Livermore.

WASHINGTON, ME.—The incorporators named in the charter of the Washington Telephone Company, granted by the last Legislature, have elected officers and formed plans for commencing the construction of a telephone system.

WINFIELD, MD.—The Carroll County Telephone Company is extending its line to Winfield.

LANSING, MICH.—Albert Stacy, of Grand Rapids, superintendent of construction for the Citizens' Telephone Company, was in Lansing recently preparing to complete the building of a new telephone system between Lansing and the Agricultural College.

SAGINAW, MICH.—The Valley Telephone Company has completed a line to Frankenmuth. Work has just been commenced on a new line to Vassar to take in Reese and a cross-line to connect with Fairgrove.

ADRIAN, MINN.—W. T. Doolittle, manager of the Interstate Telephone and Telegraph Company, of Sioux Falls, was here recently making arrangements to run wires into and through Adrian. The new line will reach from Sioux Falls to Worthington, connecting at Worthington with lines to St. Paul and Minneapolis. The company will also run lines from Sioux Falls to Yankton and Sioux City.

DULUTH, MINN.—Estimates are being taken on the new brick and stone substation which the Zenith Telephone Company will erect.

WOLVERTON, MINN.—J. H. Swanson will superintend the construction of the Wolverton Telephone Line.

LA GRANGE, MO.—The Farmers' Telephone Exchange, of this place, will begin work installing its new switchboard, setting poles and stringing wires as soon as the switchboard, which has been ordered, arrives.

LOUISIANA, MO.—Frank Buffum, of the Buffum Telephone Company headquarters here, will construct a line from Hannibal to Palmyra via Helton Station, thence to Monroe City. Mr. Buffum has also made arrangements to connect his line with St. Louis.

GENEVA, NEB.—The Fillmore County Telephone Company has commenced work on the toll line to Fairmont. Toll lines to all other towns in the county will be built at once. It is the intention to connect all towns in the county before beginning extensively on the country lines, although farmers along the toll lines will be accommodated as fast as they are built. The Geneva and Fairmount exchanges and probably toll lines to all towns in the county will be in operation within a month.

NORFOLK, NEB.—E. Duke Navin and J. S. Mahan, representing the company which is planning to place a new Independent telephone line in this city, are here from Sioux City, and are making preliminary arrangements for the establishment of their exchange.

WYMORE, NEB.—The Farmers' Mutual Telephone Line has been extended as far as the Kansas line and west.

SILVER CITY, N. M.—John L. Burnside has secured a franchise from Deming and will also get one from this city to run a telephone line into both places. The line will connect with Grant county telephone system here and with the Luna county system at Deming.

CINCINNATI, O.—Secretary D. J. Hauss, of the Fitzsimmons Telephone Manufacturing Company, said they will give the $10,000 bond required by the board of public service, and at once proceed to erect ninety-seven poles for stringing wires. Connection has been made by the Fitzsimmons Company with one of the near-by villages.

COLUMBIANA, O.—Manager Crossley, of the Columbiana County Telephone Company, will construct a line south of town.

FINDLAY, O.—Manager Pope, of the Findlay Home Telephone Company, will soon install additional equipment.

FREMONT, O.—It is understood that the Fremont Home Telephone Company will shortly expend $15,000 on a new switchboard. It is likely that the company will increase its capital stock in order to secure money to provide for the new switchboard and extension.

MARYSVILLE, O.—The Home Telephone Company is building a farmer line to Peoria. All of the farmers have signed contracts for telephones.

MILFORD CENTER, O.—A. V. Kennedy, manager of the Home Telephone Company, has just completed a farmer line out on the Bert Burnham pike. He is also contemplating to build a couple of branch lines north of town.

NORTH LEWISBURG, O.—The North Lewisburg Telephone Company is preparing to build a couple of farmer lines to Middleburg and vicinity.

CAMPTOWN, PA.—The Camptown-Herrick Telephone Company is making arrangements to extend its line to Wyalusing.

HINCKLETOWN, PA.—The Enterprise Telephone Company is working on its line through town.

LISBON, PORTUGAL.—The Portuguese Government has decided to commence at once the construction of a telephone line between Oporto and Lisbon, to join up the Anglo-Portuguese Company's exchanges in the two cities.

CLARKSBURG, W. VA.—The People's Telephone Company is progressing with the construction of lines in the upper end of the valley. About seventy-five miles of line have been completed. The system will be extended to Weston and Buckhannon and will be brought here from Johnstown.

RACINE, WIS.—It is reported that the Badger Telephone and Telegraph Company, recently organized, will construct a line from Elkhorn to Racine, and eventually to Milwaukee.

CLARKSVILLE, TENN.—The Home Telephone Company has large forces of men at work extending lines to Guthrie and Lafayette, Ky. Other out-of-town extensions will follow.

CLEBURNE, TEX.—It is announced that the contract for the construction of the Cleburne Telephone Company has been let to C. T. McCreary, of Paris, Tex. This information is obtained from W. J. Trembath, of Wilkesbarre, Pa.

GANADO, TEX.—J. E. Shutt will establish a telephone system at Ganado.

PARIS, TEX.—The Paris Telephone Company will construct a toll line from Shreveport, La., to Sherman, Tex.

TRADE NOTES

The American Electric Telephone Company, Chicago, has issued a new catalogue gotten up on original lines and in very good taste. It contains 130 pages of fine woodcut paper. The "American Beauties" are handsomely illustrated and fully described.

The New Haven Novelty Machine Company, New Haven, Conn., is sending a mailing card describing its novelty sleeves, Y-branches and 3-way branches, etc., to all writing for them. The card is folded in and when opened measures 23 x 11 inches, and has numerous woodcut illustrations.

The DeVeau Telephone Manufacturing Company, New York, has closed a contract for a complete telephone system in the Willard Hotel in Washington, D. C., and a complete system at Luna Park, Coney Island's latest attraction. The DeVeau Company has just shipped a complete telephone plant to Alaska and has received an order for a large number of telephones for the New York Central & Hudson River Railroad Company.

The Holtzer-Cabot Electric Company, of Boston, Mass., is placing upon the market its new telephone receiver. The shell is made on lines of grace and symmetry in two parts, *i. e.*, the body of the shell and the cap.

Following the latest practice, binding posts have been discarded. The terminals are entirely enclosed inside the shell, making a perfect electrical connection and doing away with the danger of the user receiving a shock, while the cord which is in all cases supplied with the receiver is given a substantial hitch about the yoke of the magnet in such a way that no strain can come on the connections. Thus the life of the cord is greatly extended, while the work of renewing the cord is very slight.

The permanent magnets are of a special grade of magnet steel, while the pole pieces are of the softest Norway iron. The construction is bi-polar. The pole pieces being semicircular in section, give a much more efficient distribution of the magnetic lines than is possible in a receiver in which the section of the pole pieces is rectangular.

The adjustment feature has been omitted entirely and the receivers are permanently adjusted before leaving the factory. The magnets are wound with silk covered magnet wire, and corrosion is prevented by nickel-plating all exposed parts.

In connection with the unusually strong magnet a heavy diaphragm is used, making an extremely sensitive instrument and one that will respond perfectly through a wide range of conditions of transmission. These instruments are carefully standardized and are made with tools, jigs, etc., so that all parts are interchangeable. The receiver may be supplied with either pure hard rubber or composition shell, and the cord may be furnished with either silk or worsted covering.

The American Telephone Journal

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REDUCTION OF EXPENSES IN EXCHANGE OPERATION*

By F. V. L. Turner,
General Manager Cuyahoga Telephone Company, Cleveland, Ohio.

For successful exchange operation, it is necessary to know the machine you are operating. It is possible for an operator to perform only a given amount of work. The load curves of all switchboards show a gradually ascending and descending line at almost a constant rate of increase and decrease. The number of operators necessary to handle a given load is determined by the amount of work required performed in a given time. The switchboard load must be evenly distributed, in order to secure a standard of operation, and the operators must be so distributed in hours of service to obtain parallelism between the load and the handling of the same.

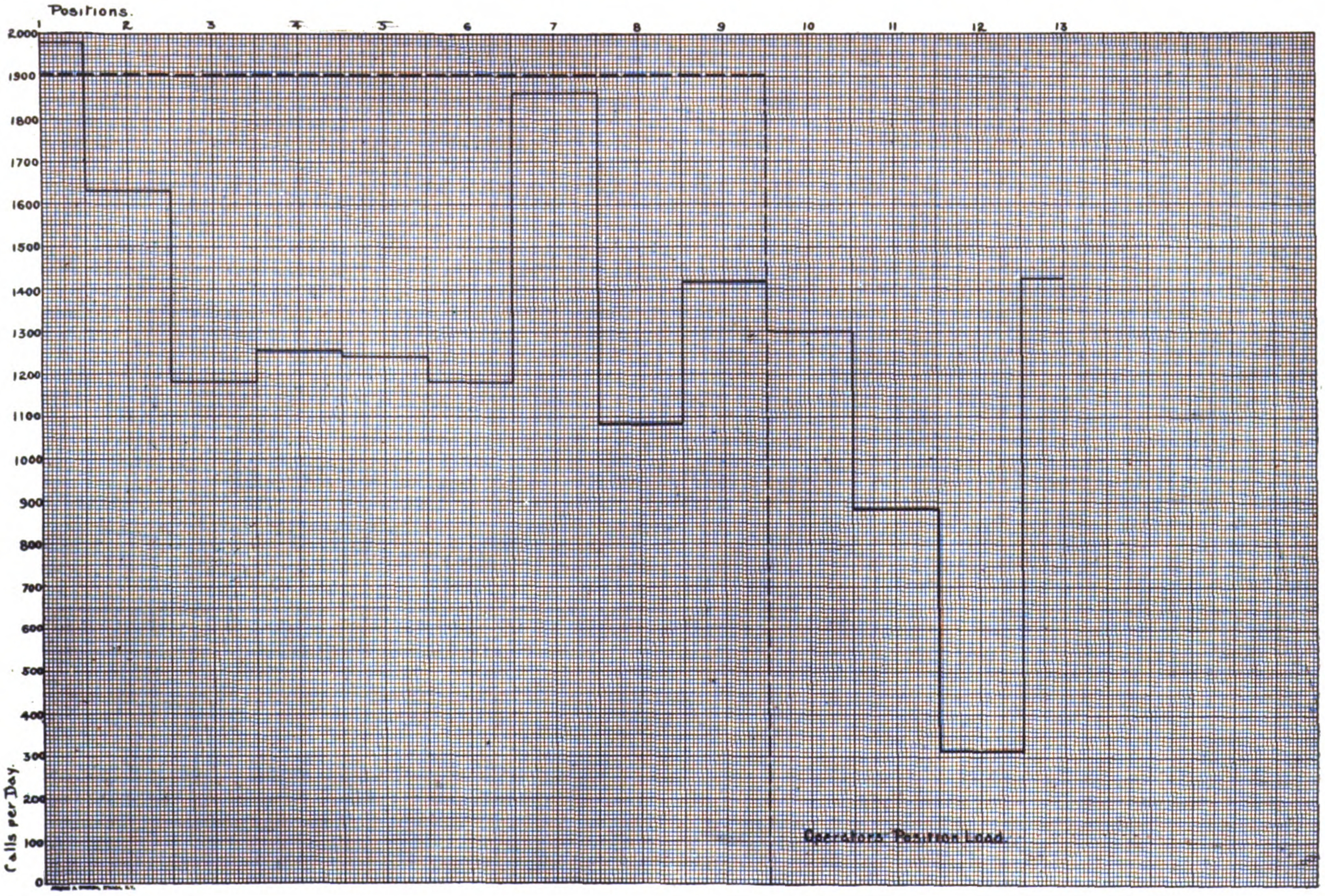

FIG. 1.—OPERATOR'S POSITION LOAD.

In lamp visual multiple switchboards, to which we must all come, the highest speed is obtainable and consequently the greatest economy. In speaking of a high standard of operation, it is meant that each operator is familiar, not only with her duties in connection with the physical handling of the apparatus, but also in the courteous and intelligent treatment of the telephone users. Uniformity is also highly essential.

It must be clear that an unequally loaded board is productive of poor operation and precludes the possibility of maintaining any standard. It is a well established fact that the operator who is idle the greater part of her time becomes thoroughly inefficient, and operators on over-loaded positions rightly conclude they are overworked.

The history of Independent telephony shows that the first section on the board is usually loaded with business houses of all descriptions, without reference to the ultimate probable switchboard load. With the knowledge that any system is better than no system, it is infinitely better to load each position with one-third business lines and two-thirds residence lines than to indiscriminately place all business lines or all residence lines in one position. Ninety-nine Independent companies out of every one hundred are necessarily located in a city where the Bell service is already established and the probable use of a subscriber's instrument should be determined to equalize the load on the switchboard. In the matter of pay stations the same rule should be followed, bearing in mind that where long distance service is contemplated through the local board, it is impossible to handle more than from twenty to forty per cent. of the volume of business cared for by local operators.

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*A paper read before the meeting of the Ohio Traffic Association, May 12, 13 and 14.

In the case of multiple switchboards, equipped with an intermediate rack, it is possible to equalize to a greater extent than in other systems. The item of switchboard maintenance affects to a greater or less degree certainly the successful, if not the economical, operation of an exchange and should be most zealously guarded.

You will notice that position 1 in Fig. 1 shows about 2,000 calls for 24 hours. Assuming from the load curve that 80 per cent. of these calls occurred between 9 a. m. and 5 p. m., the operator will have made 1,600 connections, or an average of 200 per hour, requiring for each connection 18 seconds.

Position number 8 shows that about half this number were made, requiring for each connection 36 seconds. Further assuming that the average calls per subscriber per day equal 10, and upon the same basis as the load is calculated, 80 per cent. of this would give one call per hour per subscriber.

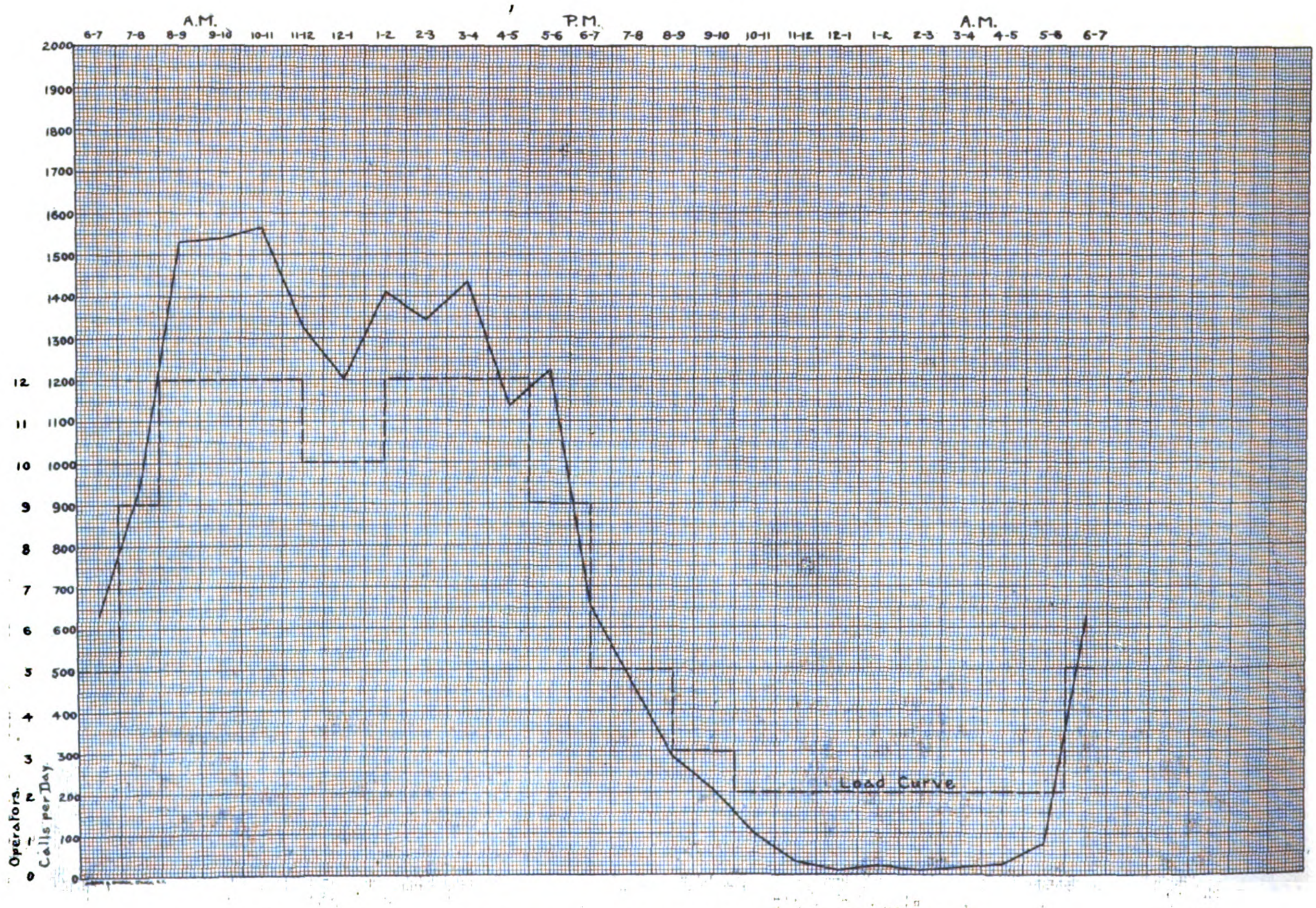


FIG. 2.—TRAFFIC LOAD CURVE.

The line in Fig. 2, representing the operators on duty, will immediately show that this exchange has reached its economical limit as to number of operators required.

Position 1 in Fig. 1 shows an abnormal condition, and with the usual objection of the subscriber to having his number changed and no intermediate rack available, precludes the possibility of any other arrangement of operators being made, and, in addition to all of the foregoing, it must be borne in mind that the seasons of the year also control largely the situation.

The position load line and the operating load line will change materially from time to time. Relieving the switchboard of one operator during the period of a low operating line would mean, during the period of a high operating line, a new operator and consequently poor service.

The operator at position 2 in Fig. 1 when taking care of position 1 cannot keep down the line on positions 2 and 1 at the same time, for the reason that she also assists to keep down the line on position 3.

The actual number of calls on position 1 on this diagram is about 2,430, but for obvious reasons was placed below 2,000.

On position 7, Fig. 1, it will be noticed that the load is also abnormally high and this is accounted for only by the fact that it is excessively overloaded.

Positions 9 and 10, as also 3, 4, 5, and 6, are nearly normal, while positions 8 and 11 are underloaded, and the proper line in the case of position 8 should be 300 calls. It is easily determined, therefore, that the standard of operation and its uniformity, coupled with discipline, is exceedingly high.

Position 12, where the highest efficiency is required, is devoted exclusively to private branch exchange trunks and therefore necessarily appears low, no assistance being given by either position 11 or 12 to each other.

If positions 1 and 3 were reversed, the position load would have an entirely different appearance, as is also the case with positions 7 and 9.

With the shifting of the load, as suggested in the foregoing, we would not reduce the number of operators. If the scheme was carried out in its entirety, and an intermediate rack placed, the result would be the cutting down of one or two positions and thus reducing the number of operators employed.

If the operators were all of the same class, of the same training and worked in positive unison, the entire line would be almost a continuously horizontal one, could be raised without any difficulty to 2,000 calls per day per position, thus still further decreasing the actual number of operators required. The load curve and calls per subscriber per day would not be affected.

In conclusion, I wish to lay particular stress upon this condition. The entire operating force should entertain for each other the best of feeling, otherwise the relief necessary at certain hours will not occur. Operators with petty differences will not help each other, and consequently the position load will not remain constant.

TELEPHONE CIRCUITS—ARTICLE VIII

By H. P. Clausen.

After the introduction of the bridging system it became desirable to operate on the party line principle. This was done by dividing the circuits, as shown by Fig. 243, in which the first, second and third stations are connected to the tip side of the line and the fifth, sixth, seventh and eighth stations to the sleeve side, and the generator connected directly across the line. Of course, the subscribers could not signal each other with this system, but could reach the central office. In work of this kind the equalized resistance plan can be followed out, as shown by Fig. 244, and can be made to operate very successfully.

In the past year a new system of selective signalling has been introduced, operating on the principle that a given impedance coil offers greater opposition to the passage of an alternating current of a low frequency than it would offer to an alternating current of a high frequency.

Referring to Fig. 245, we have a diagram showing the theory of operation of the system. It will be observed that No. 1 consists of the usual signal bell connected to ground through a condenser, though in parallel with the signal bell we have an impedance coil. Station No. 2 differs from station No. 1 in the respect that the impedance coil in place of being connected in parallel with the ringer is connected in series. Thus in station No. 1 we have a parallel combination of the ringer and impedance coil in series with a condenser to ground, while in station No. 2 we have a series combination of the ringer, impedance coil and condenser to ground.

Now, if we assume that the impedance coil at station No. 1 offers but slight impedance to a current changing its direction very slowly, say, at the rate of twenty cycles, which would be twenty-four alternations per minute, and understanding that the condenser is approximately three-tenths m. f. capacity, it is easy to see that when a twenty-cycle current is projected over the line circuit to ground it will find a ready path through the impedance coil and condenser to earth. Thus, as much current as the condenser will carry readily passes through the impedance coil and not enough is left to operate the ringer, particularly if the ringer armature is so adjusted and the equipment so constructed as to offer some resistance to the armature moving in response to a slowly alternating current. At No. 2 station an equipment is found enabling the current to readily pass through the impedance coil, but in order to allow as much current as possible to flow the condenser at station No. 2 is of much greater capacity than at station No. 1, and the ringer is so arranged as to respond to the slowly alternating currents. In other words, a 2,400 alternation per minute current over the line finds a ready path to ground through the station No. 2 and operates the bell at that station.

In station No. 1 it finds an equally ready path to ground through the impedance coil, but as the ringer is not in the series circuit the bell at station No. 1 remains quiet.

It now becomes necessary to show how the ringer at station No. 1 may be operated to the exclusion of station No. 2. Remembering that the ringer at station No. 1 is made to respond to rapidly alternating currents only and station No. 2 to slowly alternating currents, it is easy to see that when a current alternating at the rate of 7,200 alternations per minute passes over the circuit, the No. 1 station bell will respond readily, while the No. 2 station bell offers opposition. But, most important of all, in the No. 2 station we have an impedance coil connected in series with the bell equipment, and this impedance coil has its apparent resistance to the rapidly alternating currents raised to an enormously high figure, which is so great as to absolutely preclude any possibility of operating the signal bell. In station No. 1 the same effect of great opposition to the rapidly alternating current is present, which results in the signal bell windings receiving all necessary current for operating it. Therefore we have the following effects while ringing out over the circuit with the high frequency current: In station No. 1 the impedance coil raises its apparent resistance to a very high figure, permitting the current to pass through the ringer and condenser to ground. In station No. 2 the apparent resistance of the impedance coil is brought so high as to leave the ringer movement practically unaffected without considering any mechanical obstruction. The circuits of this class of apparatus will be considered more thoroughly in connection with the other party-line instrument circuit combinations. Fig. 246 shows diagramatic connections of the two-party selective service based on the plus and minus principle, as shown in Fig. 242, while Fig. 247 shows three-party metallic selective service based on the system shown in Fig. 245, the first station on the line being arranged to respond to a frequency of 240 cycles, while, of course, the stations 2 and 3 are arranged for responding respectively to 60 and 20 cycles.

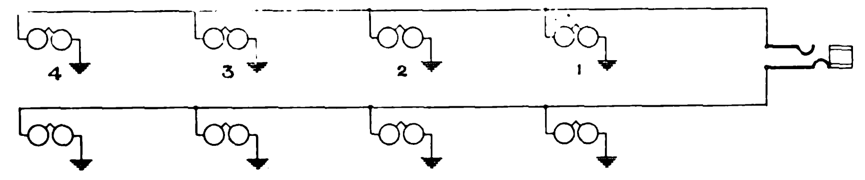


FIG. 243.

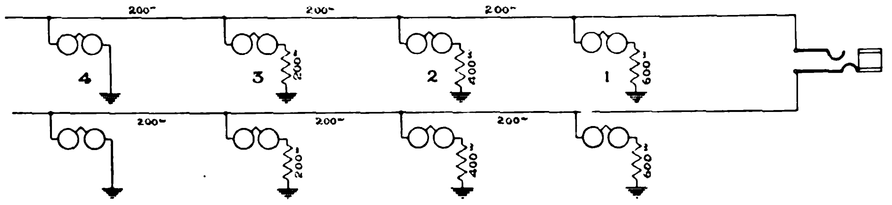


FIG. 244.

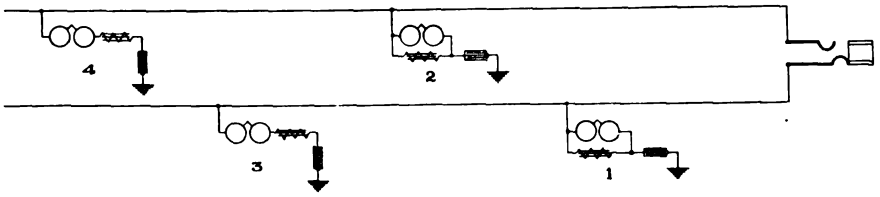


FIG. 245.

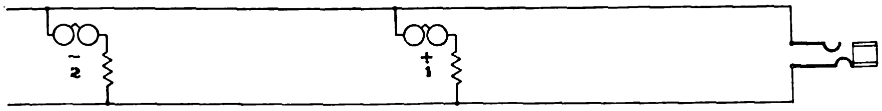


FIG. 246.

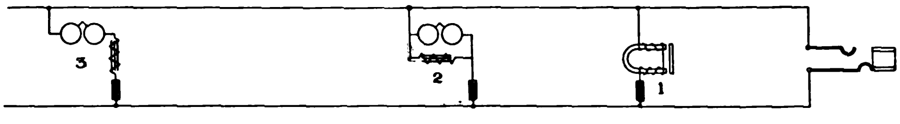


FIG. 247.

Editor's Note:—The first article in this series appeared in the issue of November 22. They will continue for many months.

FOREIGN CURRENTS

By "The Arrester."

OPPOSITION telephony makes but little headway in Great Britain, though it is steadily on the increase on a small scale. That the conditions are not tempting for practical commercial competition is evident from the fact that all the Independent systems so far started are fathered by the municipalities. The single exception is the Post Office system in London, which differs from most competing telephone systems in being worked under an agreement with the existing company at the same rates. In London also there is intercommunication between the two systems, so that the older and larger system should without difficulty obtain the larger share of the patronage. The municipal systems have no intercommunication with the existing company systems in their respective towns and cut rates in a wholesale way, so the company has to meet active competition wherever a municipal system is started. So far, however, there have been but two competing municipal systems with an appreciable record, and one of these has disappeared; the other, Glasgow, is still going, and is growing at a satisfactory rate. Three other municipal systems are in various early stages of construction, and another municipality, that of Hull, has just decided, after long and strenuous discussion, to enter the telephone field. Of any active interest in the subject on the part of any other of the many large towns and cities in Great Britain, we fail to note any sign.

Monoply Unpopular in England

The telephone monopoly in Great Britain is not exactly popular, nor are its rates considered cheap; so the lack of any general movement in favor of competition is not entirely due to general public satisfaction with the existing state of things. It is due, in the first place, to the difficulties imposed by the government control of the entire industry, from which devolve all the paralyzing conditions of limited license, Post Office royalty and a whole string of rules, regulations and restrictions which private enterprise naturally balks at. Indeed, it is understood that the Post Office will issue no license to a company unless it has the approval of the municipality concerned; so a company would have the municipality as well as the Post Office to deal with, and private capital is not, as a rule, looking for that kind of a situation. Any competition with the existing system must therefore devolve upon the municipalities. The municipalities naturally have to fall back upon a technical adviser. The only telephone expert the British municipalities have been able to find is one whose ideas on telephony are about fifteen years behind the times, and the municipal systems are antiquated before they start, and are planned without any regard to the development that the experience of recent years shows to be easily attainable. This latter point brought the Tunbridge Wells system to grief, and as to the former, it need only be mentioned that the Glasgow municipal system is a call-wire system—a method of working that Independent telephone men in this country hardly even remember, so long ago did it disappear from American practice.

N. T. C. Has Nothing to Fear

Against this sort of competition the National Telephone Company easily holds its own, in spite of the lower rates made by the municipalities, and doubtless it will continue to hold its own to the end of the chapter. Were the British municipalities to go into the business on modern lines, employing a modern plant and running the whole business according to up to date telephone methods, there would perhaps be a different story to tell and a different forecast to make. But there seems to be no prospect of that. In all the numerous discussions of municipal telephony that we find in the various English technical journals and newspapers the same antiquated and narrow-minded ideas prevail, unrelieved by a single flash of modern enterprise or by a single suggestion of any appreciation of the possibilities of up to date telephony. There is plenty of gush, however, over the little municipal systems that do start, as witness the following from the *Electrical Engineer*: "We have received a very handy little volume giving a list of subscribers and other information with regard to the Corporation telephones at Portsmouth and district. The manager and engineer of the undertaking is Mr. C. M. Gardner, A. M. I. E. E., and Mr. A. R. Bennett, M. I. E. E., of Glasgow, is the consulting engineer. The *Portsmouth Evening News* recently interviewed both these gentlemen, and after congratulating Councillor Dittman and his colleagues upon the wisdom and courage they have displayed, made the following comment:

The Newspapers' View

"'In the face of unparalleled opposition and misrepresentation, the council determined to provide the public with a much cheaper and a better service than the only one available, and they have succeeded beyond their most sanguine expectations. The work, notwithstanding many unexpected difficulties, has been carried out within the modest estimate of Mr. Bennett, the engineer, and the service is so excellent in character that the number of applications is in excess of the accommodation provided.' Originally," adds the *Engineer,* "only 240 lines were intended This number has already been exceeded, and additional orders are being received daily; 969 subscribers have actually been connected, and 323 are in order." [This looks like pretty poor work, but presumably the *Engineer,* which is pretty careless with its English, meant *on* order, *i. e.,* 323 orders in hand.] "In the course of the above-mentioned interview, Mr. Bennett said an interesting point in connection with the Gosport line is that it is the longest junction line in Great Britain. Although Gosport is separated from Portsmouth by only a narrow strip of water, the Town Hall (at Portsmouth, where the main exchange is) and the switchroom at Gosport are 18½ miles apart by wire, and there are many trunk lines much shorter than that." The American of this is that a "junction" is a local trunk, and a "trunk line" is a toll or long distance circuit, operated by the Post Office.

National Company's View

The National Telephone Company's view of municipal competition was expressed by Mr. Gaine, general manager of the company, at the recent annual staff dinner, an account of which we find in the London *Electrician.* Mr. Gaine said that the company now had working 1,050 exchanges, an increase of 25 during the 12 months; the increase in subscribers had been 26,000, bringing the total to well over a quarter of a million. The traffic amounted to 844,000,000 messages a year. These figures indicated very great progress and development, but they were no indication of what the company could do or desired to do, or of what they ought to do if they had the opportunity of doing it. They were all aware of the unfortunate restrictions under which the company had to labor. The public had a real and very great grievance in the position in which telephony remained at the present time in Great Britain and the conditions under which it was carried on. He sincerely hoped that the telephone position generally throughout Great Britain and the necessity for adequate and efficient development would soon be recognized by those in power.

Municipal Concerns Scored

In regard to the subject of competition, continued Mr. Gaine, he might perhaps just mention Tunbridge Wells. He had no wish to sound a pæan of triumph, because Tunbridge Wells was only an example of what they all knew to be the outcome of a more or less foolish competition and an attempt to do the impossible. Then let them take Glasgow. Glasgow Corporation was a great municipality which had embarked upon competition with the company. He did not believe that Glasgow knew yet the financial result of that competition. The company was increasing its business and holding its own in the competition. Although the Corporation had now got a large number of subscribers, and the company a still larger one, he thought it was not altogether advantageous to telephone users that 40 per cent. of the Glasgow subscribers found it necessary to pay two subscriptions to be on both systems. The only other case was that of the company's competition with their masters, the Post Office, in London. That department was doing its work well, but the company, on the other hand, had no reason to be apprehensive. Recently, Mr. Austen Chamberlain had stated in Parliament that the Post Office were adding subscribers in London at the rate of 150 to 200 a week. He (Mr. Gaine) thereupon called for the company's London figures, and he found that they were adding at the rate of 240 a week. Whatever anxiety might have been felt at first about competition, he did not think now that they had anything to fear from it.

A NEW ERA FOR THE PITTSBURGH & ALLEGHENY

By H. A. Lane, *Special Correspondent.*

The control of the Pittsburgh & Allegheny Telephone Company has passed from the hands of Baltimore capitalists to Pittsburgh interests. The final details in the matter were arranged at a meeting of the board of directors held June 1. The negotitions leading to the change of control were carried on by Robert C. Hall, of Pittsburgh, who will be manager of the syndicate which now assumes control of the company. This syndicate bought $2,000,000 of the preferred and practically $2,000,000 worth of the common stock of the company. Of each class of stock there was an authorized issue of $2,500,000, but $500,000 of each still remains in the treasury. In addition there is $1,500,000 worth of bonds. The Hall syndicate therefore has possession of two-thirds of the stock.

The deal was conducted through the Central Trust Company, of Maryland, which acted as intermediary between the syndicate headed by George R. Webb and the Hall syndicate. J. G. Splane, who has been for 18 years at the head of the telegraph and telephone systems of the Standard Oil Company, will be president of the company, and Sidney H. Browne, now vice-president and general manager of the company, will be vice-president and secretary under the new regime. A board of directors will be elected later. Mr. Splane will resign his position with the Standard to take effect July 1 and will at once enter upon the active work of extending the P. & A. lines.

It has been reported that the Inter-State Telephone Company has secured a portion of the stock of the Pittsburgh & Allegheny Telephone Company. This is not true. The new issue of stock is all held in Pittsburgh and the company controlled by local interests. Judge J. H. Reed, M. K. McMullin and others who are identified with the Philadelphia company have sold their holdings in the P. & A., so that the present company has entirely new blood in its makeup. The plant is out of debt and has a large amount of money in its treasury. A working board has been chosen as follows: Robert C. Hall, J. G. Splane, Sidney H. Browne and John A. Weller.

This deal means that the Bell telephone interests will have in the Pittsburgh & Allegheny Company probably the most dangerous and aggressive competitor in the country. Under the efficient management of Sidney H. Browne the P. & A. has already shown to Pittsburgh people that it can furnish a local service better than the Bell and has secured and retained the good will of both the business and residence patrons. Under the new management, backed by a capital that is adequate for its plans, the company will proceed at once to connect Pittsburgh with those points where it has been crippled heretofore. Within a year Western Pennsylvania will be a network of P. & A. connections, and by means of its eastern lines long distance service as good in comparison as the local service is now will be offered. The change in control and increase in capital is a matter of much congratulation among the large business interests of Pittsburgh, who have for years been hampered and delayed by the inefficient Bell service.

The P. & A. company now has 8,000 telephones and proposes to double that number soon. Only 60 miles of new construction is required to connect the P. & A. at Johnstown, Pa., with the Independent lines reaching Baltimore and Philadelphia, and the whole of Eastern Pennsylvania. Forty miles of wire will connect it with Buffalo. Both these connections are to be made at once. Extensive plans are also on foot to extend the system throughout Western Pennsylvania and to push all construction work now in progress to rapid completion. The first of the nearby points to be benefitted will be McKeesport, Pa., where the service will be greatly extended.

PROSPECTS BRIGHT FOR SUCCESSFUL CONVENTION

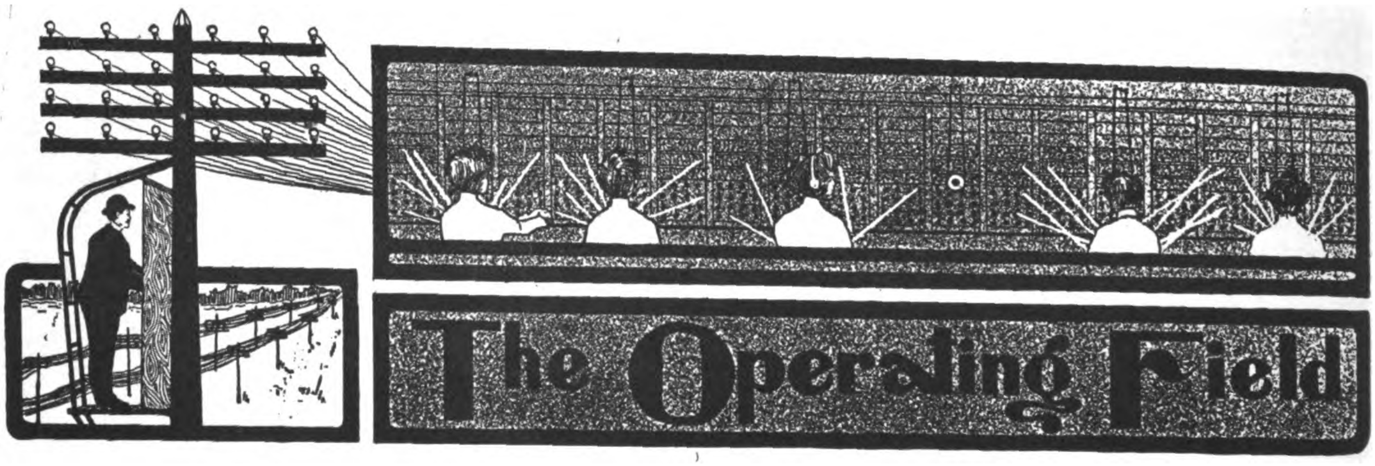
The Seventh Annual Convention of the Independent Telephone Association of the United States will be the most successful in the history of the organization, according to the outlook at present. Independent telephone men in all parts of the country are evidencing their interest in this meeting, and there will probably be a record-breaking attendance. The convention, as announced in The American Telephone Journal two weeks ago, will be held at the Auditorium, in Chicago, on June 24 and 25. Everyone interested in the Association is working hard to bring a large and representative attendance to Chicago and to insure proper entertainment of the delegates and visitors while they are in the city. The same arrangements will be made for special rates over the railroads as at each of the previous conventions.

A special Convention Number will be issued by The American Telephone Journal, which will be one of the most attractive and interesting trade papers ever published. It will be issued on June 20 and will be distributed to delegates and visitors at the Convention. The Convention Report Number, which will also be a very fine edition, will be issued on June 27. It will contain a full account of the proceedings and also the various papers read.

The programme, as announced last week in The American Telephone Journal, is a most interesting one, and every Independent operator who can possibly do so should make it a point to be in attendance. All of the larger manufacturers and supply men are arranging for elaborate exhibits. This feature is one that operators are much interested in as it enables them to keep up with the progress that has been made lately in the development of new apparatus. Manufacturer's representatives will be on hand and will cheerfully explain all the exhibits.

Secretary J. B. Ware, of the Association, in a letter to The American Telephone Journal, says: "Nearly every man on the programme has accepted the invitation to participate in the Convention proceedings, so that the changes hereafter will be very slight. Every indication at present is that the programme will be very interesting and a profitable one to those in attendance. The local committee, comprising the leading manufacturers and dealers, has prepared an entertainment which will be enjoyed by all who are in attendance. We see no reason why the attendance should not be very large, and the meeting one of our most successful. Special interest will perhaps center around the report of the patent litigation committee."

Changes in the programme as announced and developments in the outlook for the Convention will be given in The American Telephone Journal as soon as they are made public.



The Operating Field

HOME COMPANY AROUSES BELL COMPANY.

THAT alarm is felt by the Bell Company at the rapid progress being made by the Home Telephone Company in Kansas City, Mo., is evidenced by the way the older company is hustling at present. Advices from Kansas City state that the Bell Company is watching every move of the new company. Within the last week or two the former company has been making efforts to gain the good will of the telephone users and public in general. It has had men out installing a special form of pay station telephone all over town. These pay station instruments are enclosed in a small iron box, similar to fire and police alarm boxes. The door is closed merely by a spring, so that a key is unnecessary to open it. The men engaged in installing these instruments, which have been placed on the outside of nearly all the public buildings, say they are in the nature of an experiment. Complaints have been frequent that it is impossible to telephone from a pay station at night in Kansas City after the drug stores, saloons, etc., are closed. The latest move of the Bell Company is expected to remove this cause of complaint.

In the meantime the Home Company is rushing its construction work. President J. J. Heim announced that the plant will be in operation by the 1st of October and that fully 8,000 subscribers will be receiving service within a month from that date.

BRIGHT OUTLOOK FOR DAYTON PLANT.

THE pool holders of the Home Telephone Company, of Dayton, Ohio, recently held a meeting at the call of the trustees, the purpose of which was to formulate a plan for the financing of the company and to provide for the proper compensation of the trustees. The plant is now nearly completed and it is expected that it will be in operation some time in July. The company has already installed 3,000 telephones and the prediction is made that within a year there will be 6,000 sub-stations in operation. So far $600,000 has been expended and there is no indebtedness. It was decided at the meeting to raise the capital stock from $750,000 to $1,000,000.

An auditing committee was appointed to go over the company's books and to close the construction accounts to date. The incorporation of the Montgomery County Telephone Company, a subsidiary company, to have a capital stock of $200,000, was also authorized. Holders of shares in the Home Telephone Company may invest in the new concern to the amount of one-third of their interest in the parent company. The object of this company is to develop a rural system in connection with the Dayton plant. It will operate exchanges in the small towns in the vicinity of Dayton.

MISSOURI INDEPENDENT CONVENTION.

By Wm. H. Elges, *Special Correspondent.*

A MEETING of the farmers' telephone companies of Lewis County was held at Sellers, Mo., recently. Two representatives from each company were present. John H. Blackburn was elected temporary chairman and A. Williams temporary secretary.

The object of the meeting was to consolidate and give better service to the farmers interested. A motion was carried that the various companies form an association, to be called the Farmers' Telephone Association.

All the companies south of the county seat were represented and joined the association, twelve in number. A committee of five was appointed to draw up a constitution and by-laws and were authorized to report at the next meeting.

The meeting then adjourned to meet at another time, as all business could not be transacted on account of lack of time.

SOUTHERN TOLL LINE DEVELOPMENT.

MUCH progress is being made in the Southern States in the way of Independent toll line connections. The Memphis Telephone Company, of Memphis, Tenn., is building many additional toll lines and is planning a very extensive system. C. E. Stinson, president of the company, writes as follows:

"Since my advent with this company, which dates from January 1, 1903, we have been increasing our local service very rapidly and building toll lines in all directions from Memphis. Two or three of my friends and myself are now constructing several small exchanges in Tennessee and Mississippi, which will eventually be turned over to an outside company recently organized under the name of the Memphis Long Distance Telephone & Telegraph Company. We are soliciting subscriptions for this long distance company and just as soon as we raise the required amount of money we expect to develop all the small plants in this section.

"The reason we personally have gone ahead building these small exchanges is that we know the proposition to be so good that we didn't care to wait until our long-distance company was organized. There is not a better territory in the country to-day for long distance investment than right here in the South."

SENSATIONAL NEWS FROM EVANSVILLE, IND.

By L. B. Sisson, *Special Correspondent.*.

EVERY effort has been made by the Bell company to keep the Independents out of Evansville, Ind. The latest story of the Evansville situation promises sensational developments.

In several previous articles the importance of Evansville as a telephone center was pointed out and the bitter fight going on between the New Municipal Company and the Cumberland corporation explained.

Last February an injunction was granted by the State Court of Appeals to the Cumberland Company restraining the city officials from further destruction of the telephone corporation's wires and poles. A trial was ordered to take place in 90 days. Forty days were allowed for depositions of testimony by both sides.

For the past week these depositions have been submitted and along with the sworn statements made by members of the Evansville city council there has been unearthed quite a bit of sensational testimony. According to the statement, it is alleged that four councilmen were approached in December, 1902, when the city council was about to take a vote to declare the Cumberland franchise expired and therefore null and void, by a fellow councilman with an offer to buy their vote. It is alleged that the latter stated he was employed as a medium by the Cumberland company to deal with the other members of the council and that he offered $1,000 each for seven votes, enough to insure that the franchise would not be repealed.

He was indignantly refused and the matter hushed up until recently, when it was necessarily exposed by the sworn testimony of those concerned in the case between the Municipal Telephone Company and the Cumberland corporation.

This serves to show to what length the Cumberland company is willing to go in order to retain its supremacy between Chicago and southern points. Once excluded from Evansville the strongest link in its chain will be broken. For the past six months exaggerated and false reports showing in every case an increase of subscribers have been published in the local dailies, but Evansville business men know these statements to be untrue. There is not a merchant in any of the Southern Indiana towns who has not either subscribed for an Independent telephone or else has expressed his intention of so doing.

Along with the sensational disclosure at Evansville comes the news that the new city telephone company will not let the contract for erecting the plant to any one construction company, but will buy material in separate lots. The work of construction will be in charge of City Engineer Ebersole, who has been prominent in the movement for a municipal plant since its incipiency.

MISSOURI COMBINATION OF INTERESTS.

By Wm. H. Elges, *Special Correspondent.*

IN a recent issue of The American Telephone Journal mention was made of the Lewis County Telephone Company, of Canton, Mo., buying the small exchanges in the country. It now has control of the exchanges at Canton, La Grange, Monticello, Lewistown, Ewing, Durham, Maywood, Williamstown, St. Patrick, Wayland, Derrahs, Benjamin, Winchester.

These exchanges formerly belonged to Silas Lake and W. E. Porter, who will still have charge of their respective exchanges, but better and cheaper service will now be given. New lines for connections are being built as fast as possible. The Lewis County Telephone Company now owns all the local exchanges in this county, except those at Labelle and the exchanges owned by the Citizens' Company in Monticello and Williamstown, and the Farmers' Telephone Exchange, now in construction at La Grange.

The capital was raised from about $7,000 to $35,000, $10,000 to be used for the construction of lines.

ROCHESTER COMPANY GROWING.

NOTICE has been issued to stockholders of the Rochester Telephone Company, Rochester, N. Y., that the directors deem it advisable to increase the capital stock of the company. It is stated that the business of the company is increasing very rapidly and that enlarged facilities are necessary. Among other work outlined are additional telephones, additional switchboard sections, underground cable and other equipment.

The directors' notice reads as follows:

> It is proposed to authorize an additional issue of one hundred thousand dollars at 6 per cent. cumulative preferred stock and for the sake of convenience, to allot this increased stock to the holders of the common stock, at par, in proportion to their holdings of common stock.
>
> It is proposed in case this increased stock is subscribed, to declare a stock dividend of 10 per cent. on the common stock.
>
> It is proposed to make such subscriptions payable in four equal quarterly installments beginning July 1, 1903, and to allow interest at the rate of 6 per cent. per annum upon such payments and to issue the stock when paid for in full; and to pay dividends upon fractional parts of shares at the same rate as full shares until such fractions can be combined.
>
> The following illustration will show the result of a subscription: The present holder of one hundred shares of common stock would be entitled to an allotment of twenty-five shares of the increased preferred stock and to a stock dividend of ten shares of common stock.
>
> Twenty-five shares are now worth in the market about $2,250, and ten shares of common stock about $750, making a total of $3,000, in stock at the market value for which the subscriber will pay $2,500.

As soon as this additional capital stock has been secured, the Rochester Company will make arrangements for enlarging the scope of its operations.

A NEW SOUTHERN INDEPENDENT ASSOCIATION.

AN Independent telephone association was formed by the various companies operating in the State of Florida at a meeting held last week. Representatives of the various companies met in the office of W. N. Shine, president and general manager of the Jacksonville Telephone Company, of Jacksonville, Fla.

A temporary organization was formed by the election of W. B. Mitchell, general manager of the Sanford Telephone Company, as chairman; and Ed. Scott, general manager of the Arcadia and Orlando Telephone Company, secretary. Several matters of importance were discussed at length. The most important was the question of long distance and toll connections between the various Florida companies and those in nearby states. No definite action was taken. Some such action probably will be at another meeting to be held in the near future, at which a permanent organization will be effected.

Among those present at the meeting were the following: W. N. Shine, Jacksonville Telephone Company; W. G. Brown and H. G. Hare, Peninsular Telephone Company, Tampa, Bartow, Braidentown, Palmetto, and adjacent points; F. A. Sands, superintendent, Ocala Telephone Company; W. B. Mitchell, Sanford Telephone Company; T. B. Livingston, Live Oak; Ed. Scott, Arcadia and Orlando; W. G. Rowe, Starke; Henry Jennings, Indian River Telephone Company; E. A. White, DeSoto Telephone Company; H. H. Willington, Apopka; M. N. Drew, Madison; W. H. Milton, Marianna.

RECEIPTS MORE THAN VALUATION.

KANSAS Independent telephone properties are making a fine showing in the reports they are making for assessment purposes. In several instances the receipts of the companies are in excess of the State's valuation. The following list shows receipts and valuations of some of the Independent companies in the State:

	Receipts.	Valuation.
Interstate	$6,109.00	$23,623
Topeka Independent (estimated)	30,000.00	14,308
Salina Telephone Company	19,783.87	12,924
Kansas Telephone and Elec. Co	7,321.00	7,224
American Independent	15,720.00	9,649
Rock Telephone Company	537.10	1,887
Wareham & Wood	6,000.00	3,325
Brown Telephone Company	11,755.19	8,366
Downs Western	4,000.00	6,641
McPherson Telephone Company	7,639.93	6,329
Smith-Flint Telephone Company	4,887.00	7,176
Central State	316.00	1,847
Valley Falls	1,863.44	4,589
Lyons Telephone exchange	4,656.00	3,748
Miltonville Telephone Company	1,000.00	996
Belleville Telephone Company	5,260.00	4,261
Logan Telephone Company	900.00	1,262
Hanover Telephone Company	2,200.00	1,174
Chetopa Telephone Company	2,860.00	2,782
Newton Telephone Company	11,162.00	7,285
Sabetha Telephone Company (8 months)	2,441.00	3,756
Wilson Telephone Company	1,200.00	1,198
Vermillion Telephone Company	600.00	1.395
Williamsburg Telephone Company	2,040.00	2,556
Fairview Telephone Company	1,504.00	3.540
Ellsworth Telephone Company	3,850.00	2,208
Galena Telephone Company	12,432.00	5.582
Pioneer Telephone Company	8,065.00	3.977
Bennington Telephone Company	2,106.00	1.832
Yates Center Telephone Company	2,785.00	1.992
Exchange Telephone Company	5,092.00	3.737

Many other Independent companies in the state are making equally as good, if not a better showing. These figures are but another illustration of the soundness of the Independent proposition. In every state the same kind of a showing is being made.

COMPANY PETITIONS TO INCREASE RATES.

THE Zenith City Telephone Company, of Duluth, Minn., has applied to the city council for permission to raise its rates. The reason given for this action is that at the present rates it will be unable to enlarge its plant without operating at a loss. In a public letter the company gives its reasons in detail and shows by figures why it would be unprofitable to continue business on the present basis.

The council has requested the city controller to examine the company's books and to report its condition. A special committee has been appointed by the council to take charge of the company's petition and it will carefully consider all of the company's arguments.

The Editor's Page

THE OLD WAY AND THE NEW

IN the good old-fashioned days of telephony it was a favorite argument with many telephone men that it was good to make the subscriber do part of the work, because that kept him occupied and prevented him from realizing too acutely how long he was kept waiting and how slow a service he was getting. While telephone systems and telephone apparatus were crude and unreliable, and the standard of service necessarily a somewhat low standard, there was a certain amount of justification for this argument, though fundamentally it was always a wrong argument. This view of telephone working is responsible for numerous curious methods of operating, such as making the subscriber work his way through, on a trunk or transfer call, by giving his order to each operator in turn, making subscribers ring each other, and so forth. These old-fashioned methods of working have practically disappeared from this country, but in Europe, which is largely old-fashioned in matters telephonic, they still persist, and, what is more curious yet, still find their advocates. In an article published a few months ago in THE AMERICAN TELEPHONE JOURNAL, Mr. Herbert Laws Webb referred to the lack of uniformity in telephone working in Europe, and pointed out that in Great Britain alone there were numerous different systems at work, including the pre-historic call-wire system and the "ring-through" system with a special clearing out signal. These methods evidently still have their advocates or they would not be used.

The fundamental reason why it is wrong to make the subscriber do part of the work is that the subscriber is rarely an expert operator and the young lady at the exchange is, or should be, *the* expert operator. The expert operator is trained to do the required work accurately and quickly. If much of the work is done by the user of the service he will often be inaccurate and he will often be slow. Therefore even with an imperfect system of magneto or other indicator working the best results will be obtained by giving as much of the work as possible to the expert operator and as little as possible to the subscriber. The work will be more accurate and will be more quickly done. Consequently a better service will result generally, and the plant will be used more economically. It is clear, then, that the argument in favor of giving part of the work of operating to the subscriber is fundamentally wrong. Our policy should be, on the contrary, to reduce the work required of the subscriber to the lowest possible amount and to throw the work where it is most likely to be done accurately and speedily. The thorough soundness of this principle is clearly shown by the great improvement made both in efficiency and economy by relay working, where the work required of the subscriber is reduced to the lowest possible minimum.

ONE VIEW OF THE FARMER PROBLEM

THE paper on "The Farmer Line Problem" read by Mr. O. F. French, assistant general manager of the Federal Telephone Co. before the Ohio Traffic Association, touches on a phase of telephone development of which every operator must take notice, if he is going to do justice to his opportunities. The paper is printed in this issue of THE AMERICAN TELEPHONE JOURNAL. It has many points of interest that will commend themselves to all practical telephone men. It is thought, however, that in some of his estimates, Mr. French has not been sufficiently conservative. For example, there are many excellent authorities that would consider 5 per cent. an insufficient margin to allow for depreciation. It is also held by many practical men that his figures for construction are underestimated. It is the belief of the editor that the other figures given by Mr. French showing return on investment, etc., should also be read with some allowance for underestimation. On the whole, however, this paper is very interesting, and emanating, as it does, from a man who is actively engaged in the construction of farmer lines, it is entitled to very careful consideration.

HIGH EARNINGS OF INDEPENDENTS

IN meeting the press attacks of the Bell, one of the Eastern Independent companies touches with graphic interest on a feature of the telephone competition that in the past has not received the attention it should. This is the high average of earnings shown by the Independents and the fact that, despite the newness of the business, only a few of those who have embarked in the field have come to grief financially. In this respect the record of Independent development is unequalled by any other industry organized in the United States.

During the last five years, bank failures have outnumbered several times those of telephone companies, both Independent and Bell. There are about 6,000 Independent companies. The information bureaus established by the Bell companies for that purpose have compiled the seven years' record of Independent failures, and the list frequently published by the Bell proves the number to be less than a score.

The great majority of Independent companies are more prosperous as a class than any other line of business owned and operated by as many separate companies. In many instances, owing to the unexpected growth of Independent properties, the profits which should have gone to dividends have been used for construction and extensions, and a good surplus is thus accumulated.

Commenting on this condition the managers of the Independent telephone company, in their statement, point out this interesting difference:

"In view of the failure of the Michigan Bell Company, to which reference has been made, it is with satisfaction we give below the list of the six largest Independent companies operating in Michigan, and especially is this appropriate, inasmuch as the first Independent exchange in the United States having over 600 telephones in operation was in Michigan (1896).

"The said companies mentioned below operate more than one-half the Independent telephones in Michigan and have paid regular cash dividends as follows:

	Dividend.	Term Paid.
Citizens' Telephone Co., Grand Rapids	2% quarterly,	5¾ years
Valley Telephone Co., Saginaw	2% quarterly,	4½ years
Union Telephone Co., Owasso	2% quarterly,	4 years
Citizens' Telephone Co., Muskegon	4% semi-an.,	4 years
Twin City Telephone Co., Ben Harbor	4% semi-an.,	4 years
Adrian Telephone Co., Adrian	4% semi-an.,	4 years

"No Independent company has failed in Michigan."

Facts and figures such as these cannot be presented too often. The National, Inter-State and State associations should make it their business to see that such statements are brought to the attention of local capitalists through the newspapers of their cities.

IOWA INDEPENDENTS MULTIPLYING RAPIDLY

ACCORDING to available statistics, the number of Independent telephone companies doing business in the State of Iowa this year is far in advance of the number last year. These facts are obtained from the State auditor, who receives reports for assessment purposes from the various telephone companies doing business in the State. Last year there were 700 companies which reported to the auditor. It is stated that this year reports are coming in in large numbers and the minimum number estimated is 1,200 companies.

In addition to the companies which will report, there are hundreds of smaller companies, many of them not incorporated, which will make no report and of which the auditor will remain in ignorance. The number of new Independent companies filing articles of incorporation with the Secretary of State is growing at a very rapid rate. Similar figures to the above are coming from every State in the Union. Which all goes to show that, so far, only the minimum development of the field that lies before the Independents has been reached.

CONTEMPORARY CROSS TALK

By "The Listening Key."

IT is unquestionable that the public demands to-day a higher standard of efficiency from the telephone service than it did ten years ago, or even five years ago. Only the other day an Independent telephone company, fighting a suit which sought to compel it to give service at unprofitable rates, made the defence that the quality of service supplied six years ago, when its rates were established, was much inferior to the quality of service supplied to-day, for which it is charging, or seeking to charge, a rate fifty per cent. higher than the rate originally fixed. It is thoroughly appreciated, both by telephone subscribers and by telephone men, that the days when the working of the telephone service was imperfect and uncertain are practically past and gone. With the most modern apparatus and methods a service can be given that is very greatly more efficient than the service of five years ago at its best. This is due entirely to the introduction of central battery working and automatic lamp signalling.

An Idea of the Improvement

Some idea may be had, however, of what the improvement in working means from the figures quoted by one of the speakers at the recent discussion on telephony at a meeting of the American Institute of Electrical Engineers. Mr. E. F. Sherwood said that the average time taken by a New York operator to answer a call, was in 1897, 7.7 seconds, and in 1902, 3.8 seconds, a gain of 3.9 seconds, equivalent to a reduction in the time of answering of over 50 per cent. The average time to answer a local connection was in 1897, 27.6 seconds, and in 1902, 23.7 seconds, again a gain of 3.9 seconds. The average time of completing trunk connections had been reduced from 50.7 seconds in 1897 to 30.7 seconds in 1902, a substantial gain of 20 seconds. And, finally, the average time taken to disconnect was 17.1 seconds in 1897 and only 2.8 seconds in 1902, a very remarkable gain of 14.3 seconds, equivalent to a reduction in the time required for disconnection by five-sixths. This last figure is truly remarkable, and very strikingly illustrates the epochal advance that has been made by automatic lamp signalling.

The Real Application

Now consider the real application of Mr. Sherwood's figures In the course of his remarks he said that the present daily average number of calls in New York was, in round figures, 550,000. On this number of calls the gain of 3.9 seconds in celerity of answering means an aggregate daily saving of nearly 600 hours to the telephone users of New York. On the trunk calls an average improvement of no less than twenty seconds has been made. In a large system like that of New York, the trunk calls probably average about 70 per cent. of the total. This would give 385,000 trunk calls a day, and on that number an average saving of 20 seconds means an aggregate saving of time of nerly 2,140 hours daily—roughly speaking, *a year's time in every four days.* On the time occupied in disconnection, in other words, the time that two lines are kept together after conversation has finished and the moment passed when they should be disconnected and set free to receive or make other calls, the gain made by common battery working is 14.3 seconds. This is the largest gain of all, proportionally, and its importance is hardly fully expressed by the great aggregate gain it gives of 2,201 hours daily. This again is equivalent to a year in every four days, and the gain is time that was previously wholly wasted. This gain, moreover, affects two lines, so that the quicker disconnection means a saving in time for the plant as a whole of a year in every two days.

Truly Remarkable Results

Mr. Sherwood's very interesting figures give truly remarkable results whether applied to the total traffic to show the aggregate gain in time or whether applied to the individual connection. We find that the average trunk connection which formerly took 67.8 seconds in actual operation now takes but 33.5 seconds, a gain of 34.3 seconds or over 50 per cent. On a basis of 385,000 trunk connections daily that gives an aggregate daily saving of time of 3,668 hours. To put it in another way, if with the present traffic the speed of operating were no higher than it was five years ago, the plant and the staff would be occupied for 3,668 hours more than it actually is to do the same amount of useful work for the subscribers. The saving in wages, in copper, in central office plant, in rent, light, heat, real estate and other items represented by those 3,668 hours saved every working day would be difficult to estimate, but it must amount to a very large sum.

The Subscriber's Saving

Assume that the average traffic of the New York subscriber is 10 calls a day. He therefore spends on an average about 30 minutes a day at his telephone sending calls, and since he usually receives about as many as he sends, he spends nearly 30 minutes a day receiving calls. On his outward calls he saves in the operator's answer 3.9 seconds on each, 39 seconds in all. Of his ten outward calls, seven are trunk calls and on these he saves twenty seconds each, a total of 140 seconds. This gives a total saving of time on the day's telephoning of outward messages of 179 seconds, just ten per cent. of the total time spent at the telephone for sending messages—a very important saving of time to a business community. A business community nowadays spends a good deal of time at the telephone, and to save ten per cent. of that time through an improvement in the speed of operating is an achievement of which the telephone company may well be proud and for which the community may well be grateful. On the inward messages the saving of time does not affect the receiving subscriber so directly or so obviously. It is a curious fact, conclusively shown by Mr. Sherwood's figures, that the subscribers refuse to save time themselves by answering the bell more quickly.

Improvement In Disconnection

The other saving of time that does not affect the subscriber so directly or so obviously, and largely goes unnoticed by him, is the very pronounced improvement in the average time of disconnection. With the magneto system the signal for disconnection has to be given by a distinct action of the subscriber and many subscribers habitually neglect or forget to perform the necessary operation. To guard against errors and cut-offs, it becomes necessary for operators to supervise by listening in. Hence an average time of 17.1 seconds for the disconnection. With the central energy system the subscriber gives the disconnection signal automatically, and when the operator gets the two lamps, she immediately takes down the two cords. This reduces the time during which two lines are left connected wastefully to 2.8 seconds, a clear gain for each line of 14.3 seconds of useful time. Each subscriber having an average daily traffic of 10 messages, has his line in use twenty times a day, since he receives as many calls as he sends. So by the quicker disconnection his line is free for 286 seconds longer than it formerly was.

The Only Deduction

The one and only deduction to be drawn from these figures is that the central energy system is the only method of operating the telephone service that a modern telephone manager can consider. The telephone-using public of any city is certainly entitled to the quickest service that the telephone management can give. For rapidity of working no other system or method of operating can compare with the common battery system, and as far as simplicity and speed of signalling, no improvement can be made on the common battery system. Improvements in details there will be, but improvement on the principle there can be none.

THE FARMER LINE PROBLEM*

By O. F. French,
Assistant General Manager, Federal Telephone Co., Cleveland, Ohio.

To consider the different phases of the farmer problem in logical sequence, it is only natural at the outset to inquire into the necessity and desirability of such service. It may have been necessary several years ago to put up a fairly strong talk backed up by statistics, to convince the prospective farm subscriber of the merits of telephonic connection with the outside world; but to-day most of us are enjoying the experience of having committees of country people representing their respective neighbors come to the telephone office and make request for telephone service. As far as the telephone company is concerned, the matter is a business proposition wholly, and consequently the first question is will it pay?

The factors which determine the answer to the latter question are, construction cost, operating and maintenance expenses, and depreciation. I consider, and the experience of a vast number of operating men will bear me out, that the most important of these factors is the one of construction.

Experience proves, and most decidedly, that although there is no doubt a limit to the amount of money that should be spent on a farm line, in no other department of telephone development should more care be taken; for naturally maintenance expenses depend largely upon the quality of line construction and equipment. After careful study of this problem it was decided long ago by the company which I represent, that on any line which required cross-arms, nothing smaller than 25 ft. 6 in. top poles set 35 to the mile should be used, and for subscribers within a radius of 10 miles from the exchange, a metallic circuit of No. 12 BB iron wire is specified; beyond that limit No. 10 wire. The guying of the telephone line is of the utmost importance and if this part of the construction is well done, the stability of the line is assured and the breakage of line wire brought to a minimum. Another feature which must not be lost sight of is the equipment. On farm lines with ten or less subscribers to the line, I would recommend any standard 4-bar generator 1,000 ohm ringer telephone.

As far as the operating is concerned, the expense of this department is comparatively low, but still in the aggregate it amounts to something and must be taken into consideration.

As mentioned before, maintenance expenses depend largely upon quality of construction; but assuming that standard work has been done, maintenance cost is affected principally by weather conditions, and this calls to mind one of the important features of maintenance, that is, proper lightning protection. It would seem to me that in combination with a mica fuse and carbon arrester at the instrument, a manually operated switch mounted in an iron box should be placed directly outside the building in which the instrument is located, the subscriber to be instructed to set the switch (upon the approach of a storm) in a position to disconnect the telephone instrument and connect the line through a lightning protector to ground. The farmer would naturally feel safer and the result would be, should a static discharge take place over the line, that neither the instrument nor the protection at the instrument would be damaged, and consequently it would not be necessary for a trouble man to take an expensive trip to merely renew a damaged arrester or possibly an induction or ringer coil. The managers present certainly appreciate that such trips form no small part of maintenance expenses during the summer months.

The other factor which has been much discussed within the last few months but which is little understood, is the one of depreciation. The question of the deterioration of a telephone plant depends in a great degree upon location, environments, and the standard of maintenance. I firmly believe if a plant in this territory is even properly maintained, that at least 5 per cent. of the property cost should be set aside or charged off yearly.

As a problem let us consider an average line six miles in length and that 25 parties uniformly located along the last five miles of line have contracted for service. Based upon the above specifications and the best prices obtainable on labor and material, the estimated cost of the installation of 25 subscribers, five per circuit, would be as follows:

Poles	$525.00	
Cross-arms and fixtures	210.00	
Wire	400.00	
Guying	60.00	
Telephone instruments	312.50	
Lightning protection	25.00	
Switchboard lines	15.00	
Total	$1,547.50	
Estimated Revenue per Annum:		
25 Subscribers at $18		$450.00
Estimated Expenses per Annum:		
Operating	$25.00	
Maintenance	100.00	
Taxes	15.00	
Total		$140.00
Net revenue	$310.00	
5 per cent. depreciation charges	77.38	
Amount applicable to stock and bonds	$232.62	

The latter amount represents 15.3 per cent. on the investment, which percentage is not any too great. On a $12.00 basis the revenue would amount to $300.00, leaving but $82.62 as a surplus, the latter amount representing but 5.3 per cent. on the investment. The above comparison would tend to show that good service cannot be furnished at an inviting profit on a rental charge of but $12 per year.

You may have heard the remark, "It does not pay to build expensive farm line construction." It has been the writer's aim to show that the reason for any such statement is due to the fact that telephone rental has been placed at too low a figure.

Suppose, for instance, that the above line should be built for one-half the estimated figure ($773.75), with money worth 5 per cent., what would be the result in a monetary way in comparison to the $1,547.50 proposition? First, an annual reduction in interest of $38,696; second, maintenance would positively be doubled or in other words annual expenses would be increased by approximately $100. Viewed from any standpoint, the conclusion of the intelligent telephone man is summed up in these words: "The best construction is none too good."

For the very good reason that city subscribers are in a position to pay more for telephone service than the average suburban subscriber, it follows that there should be more profit in city business, and if but a limited amount of funds is available for new business, it naturally follows that such money would be invested first in taking care of city subscribers and the balance, if any, used in farm line construction. Now, it often happens that there is no balance. Rather than see the good suburban proposition go to the opposition, a number of suggestions have been made to the end of raising the necessary funds for taking care of such business. The following, which I will call a "preferred stock plan," appears to me as being the best scheme yet proposed. A brief outline of the plan would read as follows:

An issue of 6 per cent. preferred stock is to be gotten out; then the prospective suburban subscriber is to be offered $100 shares of the preferred stock at par, the interest on same to apply as a rebate on his telephone rental. Therefore if a subscriber whose telephone rental is $18 per year should purchase three shares, the interest on same would take care of his telephone rental indefinitely. The advantage of the telephone company which is under the necessity of employing such means is very manifest; primarily that this particular subscriber has been secured and secondarily that enough money has been acquired to take care of several other new subscribers. The question naturally arises, Will the proposition appeal to the farmer even though he has the money to invest? I will answer this question as the Yankee generally does, by asking another question. If you were getting from 4 per cent. down to nothing on bank deposits, would not a proposition which guarantees 6 per cent. on the investment be attractive to you? Most assuredly so.

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*A paper read before the meeting of the Ohio Traffic Association, May 12, 13 and 14.

The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

THE INJUNCTION IN TELEPHONE CASES.

THE following four injunction cases recently brought by and against telephone companies illustrate the great adaptability of that form of action and its great usefulness in corporation law:

The Chambersburg & Gettysburg Trolley Company has been granted a preliminary injunction restraining the United Telephone & Telegraph Company from occupying the turnpike near Chambersburg, Pa. The trolley company asserted its ownership of the turnpike and insisted on its right to occupy any portion of the roadway. It alleged that the poles and wires of the telephone company were in the way and asked that they be removed. The telephone company had begun grading for and building its line upon the turnpike and alleged, on its side, that the trolley company, while blasting upon the road, cut the telephone wires and interfered with its service. A further hearing must be had before the injunction can be made permanent.

The Ohio Telephone & Telegraph Company has secured an injunction restraining Chauncey M. Graham, of Reynoldsburg, from interfering with the company's employes who attempt to go on his land to cut branches of trees away from the wires. The company alleged that it had a contract with Graham by which it could maintain a line on his land, but that notwithstanding this Graham threatened its men with violence and forbade them entering his premises.

The Cuyahoga Telephone Company recently obtained an injunction in the Court of Common Pleas of Cuyahoga County, Ohio, restraining Charles M. Neff, of Nottingham, from moving a house and cutting down its telephone wires. In the petition it was alleged by the telephone company that to enable Mr. Neff to move the building would require the cutting of its wires, as they are but twenty-nine feet above the ground and the building is thirty-four feet high. The injunction has now been dissolved.

The injunction lately obtained by the New York & New Jersey Telephone Company to restrain the Nassau Light & Power Company from erecting poles along a country road between Mineola and Westbury, N. Y., has been dissolved. The judge, in denying the motion to make the temporary injunction permanent, said: "The Court of Appeals seems to have held that the rights of electric light companies in highways are superior to those of telephone companies. In case the electric light company goes on with its work and charges its wires with electricity it can then be readily determined whether there is such interference with rights of the telephone company as to call for an injunction."

TWO CASES OF SMITH *VS.* TELEPHONE COMPANY.

THE Central Union Telephone Company, of Ohio, is meeting with the family name of Smith quite frequently in litigation. In the recent suit of Smith against the company and the city of Ashtabula for personal injuries caused by coming in contact with a live broken wire, the jury brought in a verdict of $3,000 against the defendants jointly. Now Mary Smith, of Galion, Ohio, has started action against the same telephone company and the city of Galion. The latter suit is for personal injuries received by plaintiff striking her leg against a bolt in a telephone pole and falling violently on a projecting curbstone. She contends that the telephone pole was wrongfully placed on the sidewalk by the company and that the city was negligent in permitting it to stay there. She asks $5,150 damages. It is a peculiar coincidence that a city is made joint defendant with the telephone company in both these cases.

VERDICT FOR TWO THOUSAND DOLLARS.

IN the Federal Court at Jackson, Tenn., S. P. Bills obtained judgment against the Cumberland Telephone & Telegraph Company for damages sustained by falling from the lines and account of a defective pole. The plaintiff sued for $10,000 and the jury gave him $2,000. The court overruled a motion for a new trial.

A CASE OF ALLEGED DISCRIMINATION.

THE New England Telephone & Telegraph Company has been sued by Harvey Farrar, of St. Albans, Vt., for $500 damages for alleged discrimination against him to the detriment of his business. The plaintiff alleges that on May 3 a prominent business man of New Boston, N. H., whose agent he was in purchasing cattle, attempted to communicate with him over the company's line and that the company refused to notify him. He alleges further that on the next day, learning that an attempt had been made to reach him, he went to the office of the company and asked to be put in communication with the outside party, at the same time tendering in advance the proper fees; that his offer was ignored and the use of the telephone denied, and that he has been subjected to such treatment for the past year. The man who wanted to talk with him, he sets forth, had to come personally to the city to see him, and has already brought suit against the company in New Hampshire for damages. The answer of the company has not yet been made, but it will probably appear that the suit is the work of a man annoyed because he could not get immediate service.

CASUALTY COMPANY *VS.* TELEPHONE COMPANY.

A SUIT has been commenced in the Chancery Court at Nashville, Tenn., by the United States Casualty Company against the Cumberland Telephone & Telegraph Company to collect an alleged balance of $5,455.70. The complainant issued a policy in 1896 guaranteeing the defendant company against death or injury of employes while in the service of the defendant. The charge was based on the size of the payroll, eight cents per hundred dollars being the rate. The complainant alleges that it was represented that the payroll of the company was $15,000 while in fact it was over $90,000, as found by an examiner for the company at the close of the year. The suit is for the increased premiums alleged to be due to the complainant.

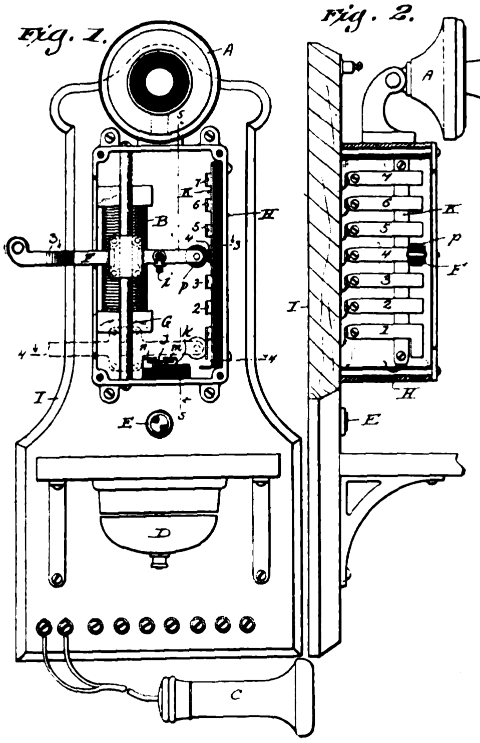
DO TELEPHONE POLES ENCROACH ON ROADBED?

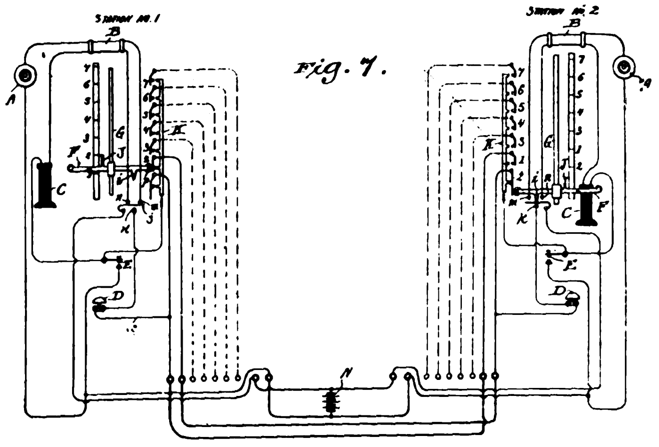
THE Keystone State Telegraph & Telephone Company is withstanding a suit in equity in which the Limekiln Turnpike Company is complainant. The complainant alleges that the defendant has planted its poles between the gutter and the roadway in many cases so as to interfere with travel, or in the gutter in such a manner as to hinder the flow of water, whereas all should have been planted between the gutter and the property line. The defense is that the gutter is so variable in width that it was impossible to plant the poles so as to avoid getting them in it or beyond it. No decision has yet been rendered.

Patents

PARTY LINE SYSTEM.

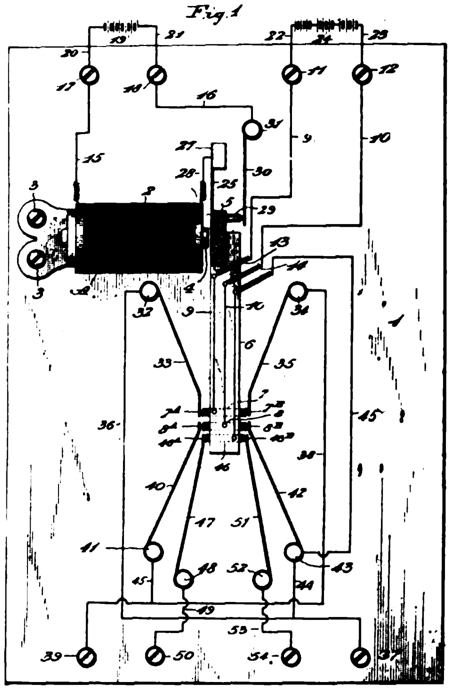
Robert H. Yurgae, Milwaukee, Wis., patents (No. 728,350) and assigns to the Signal-Phone Company an improvement in party line systems. This invention is shown in Figs. 1, 2 and 7. Fig. 1 is an elevation, Fig. 2 a section and Fig. 7 the circuits. The object of the invention is to provide a party line system, in which each subscriber can call any one of the other subscribers at pleasure. From Fig. 7 it will be seen that the various lines enter each sub-station instrument and there terminate in a number of contacts, 1 to 7, inclusive. From Fig. 1 it will be perceived that the hook switch, *F*, is modified to be a traveling arm that travels vertically to and fro on the rod *G*. The rear of the hook switch carries a roller *P*. This roller is designed to close any one of the contacts 1 to 7 inclusive, and thus forms a manual switch whereby any subscriber can put his station in connection with any other one. As soon as conversation is completed the replacement of the receiver causes the hook to fall to its lowest position and puts the station in position to receive a call.

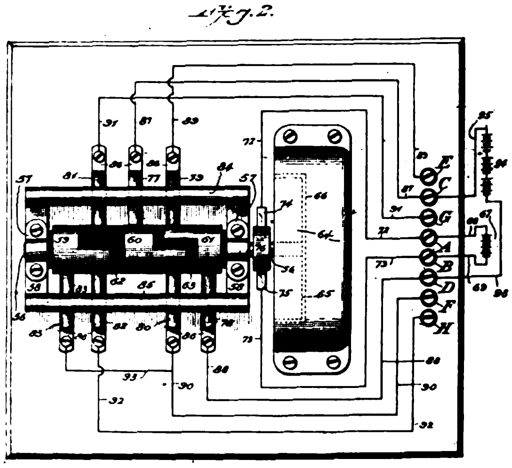




POLE-CHANGER.

John Crawford, Denver, Colo., patents (No. 728,372) an improvement in apparatus to produce alternating and pulsating currents for telephone exchanges. This invention relates to an improvement in that class of devices known as pole changers and is designed to provide an efficient and simple mechanism for supplying small exchanges with alternating current and positive or negative pulsating current for party line systems. This invention is illustrated in Figs. 1, 2 and 5. Fig. 1 shows a diagrammatic representation of the ordinary method of making pole-changers. There is an electro magnet 2, actuated by the circuit breaker 5, operated by battery 19. This electro magnet carries a vibrating armature through which circuits run from the signalling battery 24. A series of contacts, 7*A*, 8*A*, 49*A*, 7*B*, 8*B* and 49*B*, are arranged to be so operated by the vibrating armature 6 as to produce alternating or pulsating currents in the lines 39, 50, 54 and 57. Mr. Crawford improves upon this apparatus by the design shown in Figs. 2 and 5. In Fig. 2 a suitable base board carries an electric motor 64, which is operated by the battery 67. The shaft of this motor carries a commutator 55, upon which are three conducting segments, 59, 60 and 61, and two insulating





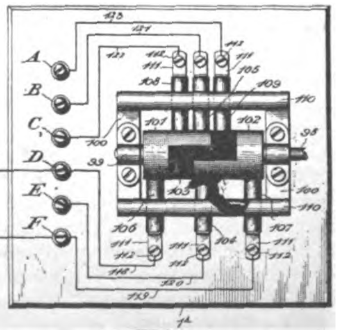


FIG. 5.

segments, 62 and 62, are mounted. There are seven brushes arranged to bear upon this commutator, of which 87 and 88 are connected to the signaling battery 94, the others to the binding posts *A* to *H* inclusive. This device, by the circuits shown, which are self-evident, is able to deliver any form of current which may be needed for party line service. In Fig. 5 a still more compact arrangement of this pole-changer is shown. The electric motor is attached to the shaft 98, the battery to the post *D* and *F*; the binding posts *A B C* and *D* are line binding posts; the circuits are self-evident.

INSULATOR.

Edward J. Burke, of Olyphant, Pa., patents (No. 728,442), an electric insulator. This invention has for its object to provide an insulator in which no tie wire is required and to provide a construction wherein the weight of the wire assists in holding it in position.

Fig. 1 is a side elevation and Fig. 2 a partial cross section of the insulator. The upper part of the insulator is cut out, as shown in Fig. 2 and adapted to receive the wedges 3 3. The wedges are provided with a rib groove for holding the wire. The wires to be insulated are stretched taut in the usual way in the vicinity of the insulators and are then grasped between two of the wedges and held in that position while the wedges are pressed into the recesses 2^1 2' until the wire is grasped firmly between them. The weight of the wire tends to hold it in this position and the fastening is complete.

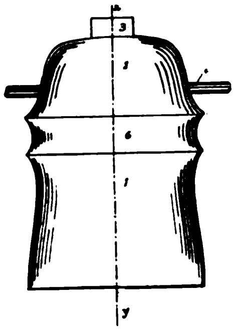


FIG 1

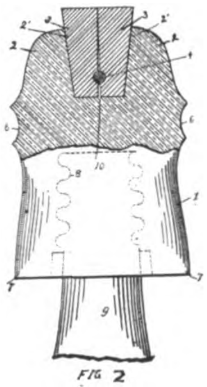


FIG 2

The insulator may be of the usual petticoat type and the wedges made of insulating material or not as may be preferred.

CABLE TERMINAL.

Joseph J. O'Connell, of Chicago, Ill., patents (No. 727,829), a cable terminal and assigns to the American Telephone and Telegraph Co. The invention, which is shown in the figure, has for its object to provide a cable head which is cheap and simple, and which will at the same time act as a protection against lightning discharges and high tension circuits. Figure 1 shows a sectional view through the terminal.

The cable is secured in a vertical position and an iron pipe slipped over its end. The lead sheath is removed in the usual way and the cable conductors spliced to okonite or rubber covered wires. After the joints are made, the conductors are bent downward and extended parallel with the outer surface of the pipe to its lower end and then turned outward. The wires are slightly separated from the surface of the pipe and held in position around its circumference by the rubber binding tape, *g*, which is then wound hard around the pipe and thick enough to constitute a plug for the end of the lead cap *b*. This cap is made to extend some distance beyond the end of the cable in order to enclose the looped conductors and to form a chamber. The end of the cap is provided with an opening *c* through which is poured paraffin or other suitable insulating material which fills in between the conductors and drives out all the air and moisture from the interior. When the cap is completely filled, the opening is closed with solder.

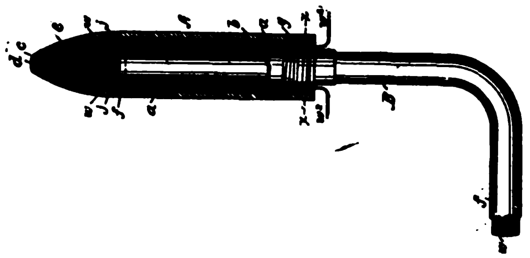


FIG. I.

The electromagnetic relation between the iron pipe and the conductors increases their impedance to lightning and high tension discharges.

MAGNETO GENERATOR.

George E. Wheeler, of Burlington, Iowa, patents (No. 728,343), a magneto generator and assigns to The Modern Electric Company. The invention has for its object the production of a simple cheap armature which can be readily taken apart for repairs.

Fig. 1 shows a plan of the armature and Fig. 3 a perspective view of the frame, the bobbins and windings being omitted.

The armature is built up of a series of strips 9, each having a central perforation 10, and a T headed end 11. The strips are arranged in parallel relation and are so placed that the T heads are arranged alternately with the straight ends as shown in Fig. 3.

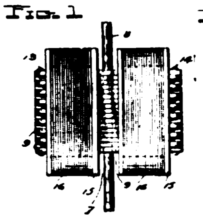
Fig. 1


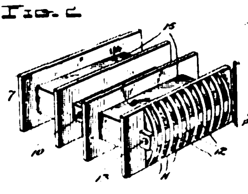
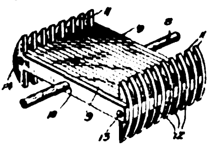
Fig. 2


Fig. 3


The strips are connected at their ends by pins or screws 13 and 14 extending through the entire series thus detachably fastening them together. The bobbins 15, are placed upon the frame during assembly, their rectangular form preventing them from rotating and the T heads and shaft 8 preventing considerable sliding.

From the foregoing construction it will be seen that by removing screws 13 and 14 and the shaft, the strips may be disconnected and the bobbins easily removed for rewinding.

Fig. 2 shows a perspective view of the armature frame and bobbins.

GUY ANCHOR.

Lester D. Pitcher, of Dixon, Ill., patents (No. 728,609), a guy anchor. The device which is shown in Figs. 1 and 2 consists of a body *A* the lower part of which is formed into a screw *B*. The part *A* is provided with a slot *D* through which the bar *E* is inserted after the anchor has been screwed into the ground and which prevents the anchor from rotating and pulling out due to the strain on the guy.

The slot *F* is provided so that the bar *E* may be placed therein and used as a lever to screw the anchor into the ground.

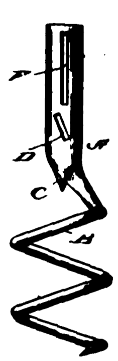
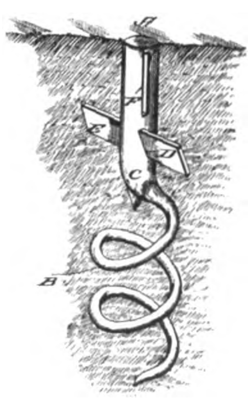
Fig. 1.


Fig. 2.


When the anchor has beeen sunk as far as necessary, a narrow trench is dug adjacent to the slot *D* and the locking bar *E* forced into the slot, the trench is then filled and the guy wire inserted through the upper end of slot *F* and fastened in any desired manner. The slot *D* is so arranged that after the anchor is in position and the locking bar in place, any backward rotation of the screw has a tendency to force the bar deeper into the ground, thus making it extremely difficult to remove the anchor until the bar has been drawn from the slot.

The Week's Messages.

FINANCIAL.

RUSHVILLE, ILL.—The capital stock of the Rushville Telephone Company has been fully subscribed.

DEWITT, IA.—The Dewitt Telephone Company has increased its capital stock to $30,000.

SHENANDOAH, IA.—The Independent Mutual Telephone Company, of Shenandoah, has increased its capital stock from $50,000 to $100,000.

SMITH CENTER, KAS.—The Exchange Telephone Company, of Smith Center, has increased its capital stock from $5,000 to $36,000.

SHARPSBURG, KY.—The Sharpsburg Home Telephone Company has increased its capital stock from $3,500 to $8,000.

ROCHESTER, N. Y.—The directors of the Rochester Telephone Company have issued notice that it is desirable to increase the capital stock by $100,000 for new switchboard capacity, cables, telephones, etc.

FRANCHISES.

WHITTIER, CAL.—The Home Telephone Company, through E. W. Bacon, has beeen granted a franchise in this city.

RIVERSIDE, N. Y.—At a recent meeting of the board of trustees of Susquehanna, a franchise was granted to the Riverside Telephone Company.

WHITESBORO, N. Y.—At the meeting of the board of trustees, the Utica Home Telephone Company renewed its application for a franchise in this village.

CLAIRTON, PA.—A representative of the Federal Telephone Company was here recently and asked for a franchise.

MINERAL WELLS, TEX.—The city council has granted the Independent Telephone Company a 25-year franchise.

OGDEN, UTAH.—The Utah Independent Telephone Company has been granted a franchise by the Ogden city council.

ELECTIONS.

ADMIRE, KAS.—Officers for the telephone company were elected recently as follows: J. J. Flinn, president; Leo Tucker, secretary; S. J. Leeburg, treasurer; C. H. Stanbury, D. W. Smith and Jacob Tucker, trustees; John Mundy, Tom Chenoweth and W. A. Harvey, committeemen.

WHITE CITY, KAS.—The White City Telephone Company has reelected the present directors who are Dr. Herbert Randles, A. R. Wallace, D. B. Jenkins, Ben Swenson and M. W. Baker. The old officers were re-elected: Herbert Randles, president; A. R. Wallace, vice-president; M. W. Baker, secretary and manager. Several new farm lines are projected which well enlarge the exchange considerably.

HANNIBAL, MO.—The directors of the Bluff City Telephone Company of Hannibal have elected J. P. Hinton treasurer, in the place of W. E. Keller, of Mount Pleasant, Iowa, who resigned. It has been decided by the management to build a long-distance line to Pittsfield, Ill. This will necessitate the laying of a cable across the Mississippi River at Hannibal.

RATES.

ST. JOHN, N. B., CAN.—The New Brunswick Telephone Company, which recently built an entirely new exchange at St. John, has found it necessary to make a small increase in rates, which are now $40 for business and $23.50 for residence telephones.

COMBINATIONS.

DELAND, ILL.—The telephone line at Heyworth, belonging to Dr. Frank Wakefield, has been sold to William Richards, whose post-office address is Deland.

SIGOURNEY, IA.—The People's Telephone system has been sold by Mrs. Dobie to C. F. Singmaster, of Keota, and Mr. Du Poise, of Washington, for a consideration of $13,000.

HONESDALE, PA.—The Citizens' Telephone Company, of Honesdale, has been bought by a new company of which the officers are: President, Andrew P. Bedford, of Scranton; secretary, Walter A. Wood, of Honesdale; treasurer, R. M. Stocker, of Honesdale.

SCOTTDALE, PA.—The directors of the Tri-State Telephone Company, have decided to purchase the Monongahela Telephone Company with connections all along the Monongahela valley.

RICHLAND CENTER, WIS.—Pease Bros., of this city, who owned a majority of the stock of the Union Telephone Company, have closed a deal whereby the control of the company passes to the Independent Consolidated Telephone Company of Milwaukee. Mr. Hutchinson, president of the company, states that the system will be greatly improved during the summer, and copper toll lines will be constructed to Milwaukee and connections made with the Fox River Valley system.

UNDERGROUND.

GONZALES, TEXAS.—A petition has been presented to the city council by the Gonzales Telephone Company, asking for permission to lay underground telephone cables under several streets.

MISCELLANEOUS.

METROPOLIS, ILL.—C. W. Green, of New Brownfield, Pope county, is here to confer with the management of the local telephone relative to establishing connection here with the Farmers' Mutual Telphone Company recently organized in Pope county.

LYNN, IND.—The plant of the Home Telephone Company here was destroyed by fire, with a loss of $1,500 on switchboard and other fixtures.

SALEM, IND.—The Hoosier Telephone Company is meeting obstacles in endeavoring to establish its headquarters. The building selected is owned by Leander Davis, the principal stockholder. The Salem Dancing Club has a lease on some of the rooms wanted. The members coming for their regular weekly dance found the doors barred; breaking through they encountered a switchboard. After throwing this into the street the merry dance proceeded.

PLEASANTON, KAS.—F. L. Ernst, manager of the Pleasanton telephone exchange, and Mt. Carmel farmers, who have erected a mutual telephone line, have come to terms by which the rural telephones will be connected to the local exchange.

GAITHERSBURG, MD.—The office and exchange of the Montgomery County Telephone Company has been damaged by fire. President Diamond stated that the loss is probably $50,000, which was fully insured.

DELHI, N. Y.—The Independent telephone companies of Delaware and Otsego counties held a meeting at Delhi and organized under the name of the Otsego-Delaware Independent Telephone Association. The following officers were chosen: S. F. Adee, of Delhi, president; W. W. Capron, of Oneonta, secretary. At the same meeting a movement was started to build a metallic circuit from Oneonta to Delhi and to Margaretville, and to connect with long distance wires already in operation.

THOMPSON, N. Y.—The annual meeting of the stockholders of the Northeastern Telephone Company will be held at Thompson, June 11.

UTICA, N. Y.—During the convention of The New York Independent Association in this city, the second week in June, the Utica Home Telephone Company will have an "opening day" at its new building. The public will be invited to inspect the plant and its appointments.

HERRICK CENTER, PA.—The directors of the North Eastern Pennsylvania Telephone Company met in Herrick Center recently and decided that all switches enabling the subscribers to switch over on any other

THE WEEK'S MESSAGES—Continued.

line without going through the centrals should be charged for at the rate of $2 per line per year for each extra line the subscriber can attach to. The annual meeting of the stockholders will be held in Thompson June 11.

SAN ANTONIO, TEXAS.—D. A. Water, president and general manager of the Commercial Long Distance Telephone Company, which owns the Independent exchanges at San Antonio, Austin, Taylor and other cities, denies that the Indianola long distance line through the Indian Territory, together with the Texas exchanges, has been sold.

LEESBURG, VA.—The Leesburg and Point of Rocks Telephone and Telegraph Line has completed arrangements for connections with the Maryland Telephone and Telegraph Company.

MADISON, WIS.—The Lenroot franchise bill has passed the Senate by a unanimous vote. This bill provides that in the future no franchise for a street railway, electric lighting, gas, water or telephone privilege shall be operative in any city in the State until sixty days after its passage by the common council. If within that time 10 per cent. of the voters shall petition that the subject of granting the franchise be submitted to a vote of the people, and the franchise shall in that case not become operative until it shall be decided at a special or next municipal meeting.

OBITUARY.

PELHAM, N. Y.—Ezra T. Gilliland, an inventor, to whom many of the improvements of the American Bell telephone are due, died recently from Bright's disease at his home in Pelham Manor. Mr. Gilliland was the inventor of the original Bell switchboard, of the magneto bell and many other contrivances now in use by the company. He was interested in the Gilliland Electrical Company, which has large factories in Adrian, Mich., and when he had perfected and patented his inventions he sent the models there to be duplicated for the market. He kept seven expert electricians employed in the laboratory at his home. He was for several years a director in the Bell Telephone Company. He had served as trustee and president of Pelham Manor.

PERSONAL.

BOSTON, MASS.—Prof. Alexander Graham Bell, inventor of the Bell telephone, has resigned the presidency of the National Geographical Society to devote his whole time to perfecting his kite flying machine.

PHILADELPHIA, PA.—Joseph F. Stockwell, lately with the Keystone Telephone Company, has resigned to become manager of the Ontario Telephone Company, at Oswego, N. Y.

New Construction in the Field

COMPTON, CAL.—The Home Telephone Company is setting poles, preparatory to stringing the wires for the new telephone service.

BOISE, IDAHO.—The Independent Telephone Company is assembling material and making preparations to extend its line from Caldwell to Payette. Construction will begin almost immediately.

PARMA, IDAHO.—A meeting was held in this town recently with the object of erecting an Independent telephone line through this section of the state. The Independent Telephone Company, of Boise, will probably take the matter up and work in co-operation with the local people.

BARRY, ILL.—The Pike County Telephone Company is extending its lines west of Barry to Hannibal.

ELWOOD, IND.—The new telephone lines of the Delaware and Madison Counties Telephone Company, extending out of Elwood in every direction, have been completed.

FRANKFORT IND.—The Central Energy Telephone Company will spend about $35,000 for enlarging its switchboard and wire plant and in making other improvements.

VINCENNES, IND.—The Knox County Home Telephone Company, of Vincennes, has completed its country lines 12 miles south to White River and is awaiting the construction of a similar line north from Princeton by the Independent company of that place.

DUBUQUE, IA.—The farmers of Grant county are in favor of connecting their farmers' telephone system with that of the Dubuque Telephone Company. It will be necessary to string several wires from Dickeyville, a distance of eight miles to the bridge. Another wire will be strung direct from Madison, Wis.

KIRWIN, KAS.—The Kirwin Telephone Exchange has arranged to build a line running straight west from Kirwin to the stone school house. There will also be a line running up Bow creek.

LOGAN, KAS.—The Logan Telephone Company has completed a line to Norton.

MEDICINE LODGE, KAS.—The Medicine Lodge Telephone Company is extending the telephone line from Lake City to Coldwater by way of Sun City and Wilmore.

PITTSBURG, KAS.—The three-story brick building for the Pittsburg Home Telephone Company is almost completed as far as the brick work is concerned.

DAMARISCOTTA, ME.—E. W. Nash, of Damariscotta, is putting a telephone line through from Newcastle to Head Tide.

PORTLAND, ME.—The Northeastern Telephone Company will probably begin the work of stringing its wires in about a month.

FLINT, MICH.—J. A. Miller has just closed a contract with the Valley Telephone Company to run a line from Flint to Clayton and thence to Swartz Creek.

STURGEON, MO.—The Sturgeon Telephone Company is building a full metallic line to Moberly. It is the intention to connect all towns where the system now extends with good toll lines and all main lines in the country are to be replaced with the cedar poles.

UNIONVILLE, MO.—The telephone exchanges at Milan and this place will soon construct a new line between Milan and here.

CHOTEAU, MONT.—The North Montana Telephone Company has just concluded a contract with Hilreath & Jones for 1,000 cedar telephone poles to be delivered along the line between Choteau & Sun River.

SHELBY, MONT.—C. H. Drake, secretary-treasurer of the Northern Montana Telephone Company, states that work will shortly be commenced on the line between this place and Gild Butte.

CORNWALL, N. Y.—Work on the Livingston Rural Telephone line is progressing finely and wires will soon be strung in this village and to Hunt. Then the work will be commenced on the Granger and Grove lines.

MIDDLETOWN, N. Y.—At a meeting of the directors of the Orange County Telephone Company, a contract was awarded for installing a central energy, double supervisory, multiple switchboard with an ultimate capacity of 1,600 drops to the Stromberg-Carlson Company.

MARION, OHIO.—The Marion County Telephone Company has completed its exchange at La Rue and has about forty telephones. The exchange at Agosta is completed with sixty telephones. An exchange was installed at Green Camp recently with forty subscribers. The exchange at Caledonia will be completed very soon.

YELLOW SPRINGS, OHIO.—H. C. Dean, manager of the Citizens' Telephone Company, was in town recently and stated that Yellow Springs will soon be connected with Xenia and other outside points and that the service for Yellow Springs will be better than it has ever been.

STROUDSBURG, PA.—Work on the new branch of the Stroudsburg and Bushkill Telephone Company's line to Mt. Pocono and six miles beyond is now under way, residents along the route being engaged in stringing the wires. The work will be rapidly pushed to completion and an exchange installed at Mt. Pocono.

SUNBURY, PA.—Charles L. Goodrum, chief engineer of the United Telephone and Telegraph Company was here recently and with H. N. Daniels, made arrangements to instal a toll line switchboard, and also to add a new section to the present switchboard.

WILLIAMSPORT, PA.—The United Telephone & Telegraph Company will construct a line through Wippenose Valley.

COLORADO, TEXAS.—The Texas and Pacific Telephone Company of this city, has decided to put a small telephone exchange in the town of Roscoe.

KAUFMAN, TEX.—The Eagan Branch Telephone Company will extend its line to Abner. From Abner the next step will be to College Mound.

LINDALE, TEX.—The Independent Telephone Company has a force of men here putting in a line from Mineola to Tyler.

SAN ANGELO, TEX.—The San Angelo Telephone Company has placed an order for a 700-drop switchboard.

BELMONT, W. VA.—The Belmont Telephone Company will build a line from St. Clairsville to Maynard, a distance of five miles, early this summer, and an extension to Freeport.

THE TELEPHONE IN THE ORIENT.

THE directors of the Oriental Telephone and Electric Company held their annual meeting in London, England, recently. Their report for the year 1902 was presented to the stockholders, being as follows:

"The revenue account shows a credit balance of $61,788.23 transferred to profit and loss. Including $14,439.19 brought from 1901, and after deduction of $21,667.76, paid as interim dividend on November 1, there remains $54,469.78 for disposal. The directors propose to pay a final dividend of 3½ per cent., making with the interim dividend of 2½ per cent. already paid, 6 per cent. for the year; to transfer to reserve $14,550, and to carry forward $9,081.40. The Bengal and Bombay telephone companies, in which the company is largely interested, have again declared dividends of 6 per cent. for 1902. The negotiations entered into with the Government of India for an extension of the Indian licenses granted to this and the above-named companies have now been brought to a conclusion. These new licenses will run for a period of 60 years, the Government reserving to itself the option to purchase the undertakings after the expiry of 20 years, or at subsequent periods thereto, on conditions which the board believe to be equitable to the shareholders. Negotiations have also been entered into with the Colonial Government at Singapore for an extension of the company's license there. The business of the Telephone Company of Egypt continues to expand, and that company has again paid the full dividend of 7½ per cent. on its preferred shares. The directors have taken up a further ten thousand pounds' worth of these preference shares, and have also made cash advances to that company towards the expenses incurred by it for cabling its system to Cairo and Alexandria and for the installation of telephone lines connecting certain villages in the province of Lower Egypt erected under agreement with the Government. During the current year the subscribers to the Egyptian Company's system at Cairo and Alexandria will be enabled to communicate with each other by means of trunk lines recently erected by the Government and which are being leased by that company. The China and Japan Telephone Company's branch at Hong Kong is continuing to make progress. The accounts have not yet been closed, but the company has paid interest on its debentures to December 31; these are all held by your company. The electric lighting business is being worked to a profit, but, as stated in last year's report, its operations are restricted through want of larger working capital. Special opportunities of business offered themselves in 1901, but these were not forthcoming last year."

TRADE NOTES

THE AMERICAN ELECTRIC TELEPHONE COMPANY, Chicago, Ill., has been awarded the contract for a 6,000 line switchboard and telephones by the Fort Worth Telephone Company, Fort Worth, Texas. This is one of the largest switchboard contracts that has been let during the past year.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY has recently sold telephones and supplies to the Farmers' Mutual Telephone Co., of Rinard, Ill.; Farmers' Mutual Telephone Company, of Richfield, Illinois, and the Farmers' Mutual Telephone Company, of Virden, Illinois.

THE NEW HAVEN NOVELTY MACHINE COMPANY, New Haven, Conn., has opened its Chicago office at 1112 Merchants Trust and Loan Building. Mr. H. J. Minhinnick, who represents the company in Chicago, is prepared to show samples of the company's line of novelty sleeves, etc., and to take orders for prompt shipment.

THE PITTSBURGH PRIVATE TELEPHONE COMPANY has just installed fourteen telephones in the plant of the Best Manufacturing Company, on the Allegheny Valley Railroad. The same company has put in four telephones for the Duquesne Brewing Company; seven for the Verona Tool Company, and will soon put in an exchange and thirteen telephones for the First National Brewery, at McKees Rocks, Pa.

THE HUGHES-MACKINTOSH COMPANY, Minneapolis, Minn., has a very large stock of poles ready to ship in carload lots. In the mpany's advertisement this week, on page 14, the number of and the size of poles of each lot is shown in tabulated form. The company, in order to make quick shipments of this stock, is prepared to mix different sizes of poles to suit the purchaser. It is announced that the Independent telephone interests are taking advantage of this opportunity to get orders for poles promptly attended to, and the various carload lots are being sold at a rapid rate. The Hughes-Mackintosh Company is one of the oldest and best known in the pole industry.

THE WESTON ELECTRICAL INSTRUMENT COMPANY, of Waverly Park, Newark, N. J., recently made good its promise, and turned over to its employees the elegant club rooms which have lately been constructed. Over a thousand guests were present at the dedication. Among the guests of honor were the Governor of the State, the Mayor and all of the prominent city officials of Newark, also Mr. Weston, president of the company. The evening's entertainment consisted of a vaudeville performance by local talent, after which a presentation address was made by Mr. Weston. Mr. A. O. Benecke responded for the employees, thanking the company heartily. A huge loving cup was presented to Mr. Weston by the employees. Mr. Weston responded, assuring them of his appreciation.

Supper was served in the club dining room, after which the guests danced until an early hour in the morning. The next day was designated a holiday by the company.

The entire government of the club, including the restaurant, will be left to the employees. The company considered every detail of arrangement before turning the club over to the members and gave them all the furnishings and the benefit of its financial backing.

Features of the club are an ice manufacturing plant, a modern swimming tank over 130 feet long, and a foremen's dining room, in which Mr. Weston will dine with the foremen of the various departments. While at the table the foremen will be able to discuss with their employer any feature of their work or any problem that may come up.

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

TELEPHONE SYSTEM in Central Kansas, 100 miles toll line, 425 subscribers. Will take $40 per mile for toll lines. Address Box 55, car THE AMERICAN TELEPHONE JOURNAL, New York.

INDIANA telephone plant for sale; has 150 subscribers; good opening for young man with some knowledge of the business. Address The Telephone Engineering Co., 337 Lemcke Block, Indianapolis, Ind.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

DRAFTSMAN familiar with telephone cable distribution, handling men, making out estimates, etc. State experience and salary expected. Address BOX 56, care THE AMERICAN TELEPHONE JOURNAL, New York.

SUCCESSFUL manager will be open for position about August 1st. Familiar with up-to-date system and methods. South or West preferred. Satisfactory references. Address BOX 54, care THE AMERICAN TELEPHONE JOURNAL, New York.

POSITION AS TROUBLEMAN; have had seven years' experience as local and long distance telephone troubleman, and also fire alarm troubleman; Minnesota or Dakota preferred. Address BOX 50, care THE AMERICAN TELEPHONE JOURNAL, New York.

A GOOD practical man to act as superintendent of telephone exchange; capable of taking care of both outside and inside plant. Must be sober and industrious. State wages and experience. Address BOX 52, care THE AMERICAN TELEPHONE JOURNAL, New York.

The American Telephone Journal

VOLUME VII. *SATURDAY, JUNE 13, 1903* *NUMBER 24*

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HOW THE KELLOGG COMPANY WAS SOLD OUT TO THE BELL

FOR several months it has been rumored in the trade that a controlling interest in the Kellogg Switchboard and Supply Company, of Chicago, had been secured by Bell agents. All efforts to trace these rumors to an authoritative source failed until last week, when there came full confirmation through suits filed by Kempster B. Miller, Francis W. Dunbar and other minority stockholders of the Kellogg Company. These suits were brought to set aside the sale of 3,307 shares of stock (held by Milo G. Kellogg) to the American Telephone and Telegraph Company. Suit was also instituted to restrain the purchasers of Mr. Kellogg's stock from exercising any power of control over the Kellogg Company's affairs pending the issue of the action for annulment. In connection with these suits there has come to light a most extraordinary story of falsehood, deceit and business duplicity. The facts have been carefully investigated by the editor of this paper, who has been in Chicago for some time, and he has prepared the attached statement covering the transaction.

THE Kellogg Switchboard and Supply Company was organized in 1897 with Mr. Milo C. Kellogg, of Chicago, as its president and principal stockholder. In the fall of 1901 Mr. Kellogg's health broke down, and about November 1, of that year, he was obliged to entirely give up his business, and left Chicago for California for an indefinite absence. Mr. Kellogg left the management of the Kellogg company in the hands of Mr. Wallace DeWolfe, of Chicago, who was then vice-president of the company, and entrusted Mr. DeWolfe with power of attorney for his personal property, so as to provide for any emergency that might arise in his affairs and those of the Kellogg company during his absence.

Prior to Mr. Kellogg's departure a large amount of money had been expended in the increase of the plant of the company; an increase in the capital stock of the company had been made to meet the expenditure which was in progress, and a certain large customer and debtor of the company was in a precarious financial condition.

Shortly after Mr. Kellogg's departure, or about January 4, 1902, Mr. DeWolfe sold Mr. Kellogg's entire interest in the Kellogg company, amounting to about two-thirds of the entire capital stock of the company, to Mr. Enos M. Barton, of Chicago, president of the Western Electric Company and representing, as is understood, the Bell telephone interest.

This sale was made without Mr. Kellogg's knowledge or consent, and Mr. Kellogg was not advised of the sale of his stock until six months thereafter. At the same time Mr. DeWolfe sold his own stock in the Kellogg company, amounting to 202 shares, and effected also the sale to the same party of the stock owned by Mr. Clarence Buckingham, of Chicago, a director in the Kellogg company. No other director, officer, employe or stockholder of the Kellogg company, with the exception of the secretary, was advised of the sale or knew of the sale until more than a year thereafter.

No record of transfer of the stock was on the books of the Kellogg company, and all employes, and particularly those connected with the sales and engineering departments, were given the most positive assurance that there was no truth in the rumors that the Kellogg company was controlled by the Western Electric Company.

On July 4, 1902, six months subsequent to the sale of his stock, Mr. Kellogg having sufficiently recovered his health to inquire into the affairs of the Kellogg company, was advised by Mr. DeWolfe that his stock had been sold to Mr. Barton. Acting upon the advice of his counsel, Judge R. S. Taylor, Mr. Kellogg, as soon as his health permitted, began negotiations through his counsel with Mr. Barton and with Mr. Frederick P. Fish, president of the American Telephone and Telegraph Company, for the repurchase of this stock.

These negotiations have continued without interruption since the first of October, 1902, to the present time. Up to about the first of this year there was every prospect of these negotiations being successful and that Mr. Kellogg would again obtain possession of his stock and the controlling interest in the Kellogg Switchboard and Supply Company, so that he could again control the management of the Kellogg company and could assure his friends and the company's customers that their interests would be protected and all of the obligations assumed by the Kellogg company fulfilled to the letter.

About the first of the year, however, Mr. Barton advised Mr. Kellogg and his counsel that it had been definitely decided to reject all propositions for the repurchase of his stock, and that any additional price which Mr. Kellogg might offer for the stock would not affect the decision in this matter. Mr. Kellogg had already offered to repurchase his stock at a price which would have been a large profit to the Bell interests.

Mr. Kellogg then appealed to the Bell interests to reconsider the matter from an ethical standpoint—that is, from the standpoint of the damage which would result to his friends and customers and employes of the Kellogg company who had been placed in a false light by the action of both parties concerned in the sale of his stock. To this appeal the Bell interest also turned a deaf ear.

On the first day of March, 1903, Judge R. S. Taylor informed Mr. F. W. Dunbar of the condition of the Kellogg company and its relation to the Bell interests. Mr. Dunbar was the first employe of the Kellogg company to be informed of the existing situation, and he immediately took up the matter with Mr. Kellogg, who placed the entire correspondence and records of the negotiations at his disposal and explained all details of the situation. The situation was discussed and examined with the object of finding some way to insure the protection of the customers of the Kellogg company in the future as they had been protected in the past. Legal advice was again sought, and it appeared that the minority stockholders of the Kellogg company could secure legal redress, and by so doing could insure the protection of the customers of the Kellogg company and the fulfilling of its obligations to the Independent telephone interests.

On May 19, 1903, Mr. Kempster B. Miller and Mr. F. J. Dommerque, of the Kellogg company, were for the first time made acquainted with the situation, and with Mr. Dunbar decided to bring suit against Mr. DeWolfe, Mr. Barton, Mr. Fish, the American Telephone and Telegraph Company and the Western Electric Company for the recovery by Mr. Kellogg of his stock and to restrain the Bell interests from disposing of the stock until it could be returned to its rightful owner, and from voting said stock to control or influence the management of the Kellogg company, or from influencing in any manner the management of said company or from interfering with any of the patent suits now pending against the Kellogg company and its customers.

The suit was brought in the Circuit Court of the State of Illinois on Friday, June 5, 1903, by Henry S. Robbins, Esq., attorney for the minority stockholders, and on that day Judge Tuley of that court granted a preliminary injunction to the above effect. Mr. W. W. Dean of the Kellogg Company, and other minority stockholders joined in the suit.

The suit brought by the minority stockholders of the Kellogg company is not only in the interest of these stockholders, but is primarily in the interest of the customers of the Kellogg company. The most eminent counsel available has been secured, and the minority stockholders are confident that the Bell interest will be permanently barred from influencing the management of the Kellogg company and also that the sale of the stock will be nullified and Mr. Kellogg reinstated to active management.

The present situation is one in which the customers of the Kellogg company may now feel assured that their interests will be fully protected by the Kellogg company under its old management.

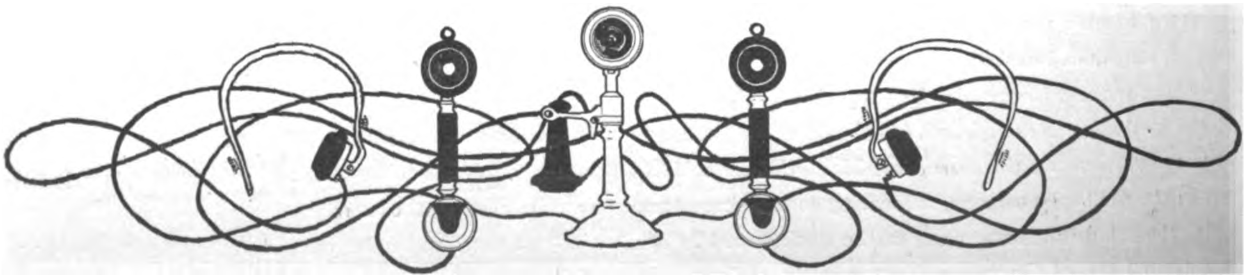
THE KELLOGG CONTROLS NO INDEPENDENT OPERATING COMPANY

It has been suggested that the sale of a controlling interest in the Kellogg Switchboard & Supply Company, should it be sustained by the courts, would carry with it a control of the big Independent companies equipped with Kellogg apparatus. The official statement from the officers of the Frontier Telephone Company, at Buffalo, N. Y., shows that this suggestion is without the slightest foundation so far as this company is concerned. The American Telephone Journal has similar assurances from the Cuyahoga Company, of Cleveland, Ohio; the Home Telephone Company, of Los Angeles; the Keystone Telephone Company, of Philadelphia; the P. & A., of Pittsburgh; the Maryland T. & T., of Baltimore; the Kinloch, of St. Louis; the New Telephone Company, of Indianapolis, and every other company of consequence that uses Kellogg apparatus. Detailed statements from all these companies will be printed in our next issue.

Editor of The American Telephone Journal:

There is absolutely no truth in the suggestion that the Kellogg Company owns an interest or any stock in the Frontier Telephone Company's plant. All transactions with the Kellogg Company were on a cash basis.

H. H. PERSONS, Vice-Pres. & Gen. Man.
CHAS. B. HILL, Sec. & Treas.
FRONTIER TELEPHONE COMPANY.



NEW YORK STATE INDEPENDENT CONVENTION

By Terrell W. Croft.

CHAS. O. HARRIS,
First Sec. and Treas., N. Y. State Association.

HARMONY was the watchword of the New York State Independent Telephone Association, which held its Adjourned Annual Meeting at the Butterfield House, Utica, Wednesday, June 10, 1903. The differences that existed between the two rival associations were adjusted, and the two were amalgamated into one strong body.

The Association was called to order at 2:15 P. M. by the president, George R. Fuller, of Rochester. He delivered his opening address as follows:

Most of you were present at Rochester when the Association came into existence and know what turmoil and strife accompanied its birth, and I wish at this time, in the name of the Association, to make a public acknowledgment of gratitude to the men who loyally defended our right to organize and who successfully guided us into the ranks of legally incorporated bodies.

I regret to be obliged to report that little has been done since our organization to add to its membership or to its treasury or to impart such information to its members as was planned should be done. There has been a feeling that we could not do vigorous, profitable work until there had been a complete harmonious fusion of all factions and all honest, sincere friends of Independent telephone work in the Empire State had joined hands and all interests had become cemented in one strong, united organization.

While we still maintain that our organization was conceived without a thought of ignoring or excluding any territory in the State or any person or company from its councils who were eligible for membership, a hearty welcome awaits any and all good, earnest Independent telephone workers in the State who will join us.

It has been frequently stated that New York State was much behind other States, and particularly the Middle Western States, in Independent telephone development. A year ago this may have been a fair statement. The records for the past few months, however, would indicate that the Empire State was making such strides as would soon place her in the front ranks in this most popular movement.

Since our organization, in July last, exchanges have been opened and are being operated in Buffalo, Albany, Troy, Elmira, Binghamton, Jamestown, Ithaca, Canandaigua, Penn Yan, Lockport, Batavia and dozens of smaller towns in the State, representing in all a million people or more. Add to these Niagara Falls, Medina, Albion, Brockport, Rochester, Geneva, Auburn, Syracuse and many other populous towns through the State to the very gates of the metropolis, where prosperous exchanges were in operation previous to a year ago. What power or unsavory methods of our special opponent can prevent our further progress, development, popularity and prosperity and the rapid uniting of this vast population with Independent connecting lines?

Allow me to prophesy that our next annual meeting will be announced by telephone over Independent lines to every member of the Association, even reaching such stalwarts as Messrs. Barber, of Wauseon, Ohio; Brailey, of Toledo, Ohio; Rawson and Brush, of Elyria, Ohio, and Messrs. Barnard and Davis, of Philadelphia, Pa.

Our constitution was framed somewhat hurriedly, and it has occurred to me that it would be well to consider the question of some amendments before making determined efforts to increase our membership or urging the payment of the annual dues. The schedule of dues as provided for in our constitution is as follows: For toll lines, $2 for the first twenty-five miles and $1 for each additional twenty-five miles. These rates, I believe, are moderate and reasonable. For exchanges the annual dues are $2 for the first 100 telephones and $1 for each additional 100.

There is a provision also that assessments for defraying extraordinary expenses may be levied from time to time, not to exceed in any one year a total of five cents for each main line telephone in use and five cents for each mile of toll line in use over which paid messages are transmitted.

The annual dues for exchanges and the amount of extra assessments permitted I believe to be excessive. The dues should be so moderate as not to interpose an obstacle in the way of any individual or company in the State who are eligible to membership from coming in voluntarily. Every Independent telephone interest in the State should be represented in our membership, and I believe the first step towards making the Association so popular as to gather them all in should be moderate dues. I, therefore, suggest for your consideration the following:

For exchanges, $2 for the first 100 telephones or less; $1 for each additional telephone up to 500. For each additional 100, from 500 to 1,000, 50 cents. For all additional telephones above 1,000, 25 cents for each 100, and that extra assessments for any one year be limited to 25 per cent. of the annual dues.

Would it not also be advisable to so amend our constitution as to provide for the acceptance as members the manufacturers of telephone apparatus and supplies, possibly giving them a representation for the submission and discussion of papers referring to the welfare of the Association and its members without the right to a vote? It would be acceptable and be of much value and good to the operating interests represented by the Association.

I submit these questions, as I think they are such as should be considered, and, inasmuch as no committees have been appointed for work during the past year, I suggest, if there are no objections, that a committee on amendments to the constitution be appointed, and if this committee think best to recommend any revision, report at this meeting, that action may be taken before final adjournment.

Roll was called by the secretary, and it was found that practically all of the members were present. The secretary and treasurer read his treasury report, which was referred for ratification to an auditing committee. This committee consists of Boyd McDowell, of Elmira, and Mr. Potter, of Syracuse.

Later in the meeting, upon a favorable report of the Auditing Committee, the treasurer's report was accepted.

Mr. Charles O. Harris read a very strong paper, showing the Independent growth in the State of New York, which will be published in full in a later number of The American Telephone Journal.

A Committee on Membership and Credentials was appointed by the president, which was composed of Mr. Brush, Mr. Ferris, Mr. Davis, Mr. Edwards and Mr. Brailey. They adjourned for a private meeting.

Later this committee reported and recommended (after meeting a similar committee of the Buffalo Independent Association) the amalgamation of the two associations and the adoption of the following resolutions:

That all members of the Buffalo Association become and are hereby made members of this association subject to the ratification of their respective companies, and also be it

Resolved, That all Independent companies represented here to-day become and are hereby made members of this association, subject to the ratification of their respective members or directors.

These resolutions were unanimously adopted.

On motion of Mr. McDowell, of Elmira, a Constitution Amendment Committee was appointed by the chair. It was composed of Mr. McDowell, chairman; Mr. Hendrickson, of Albany; Mr. Carey, of Buffalo; Mr. Aiken, of Auburn, and Mr. Barber, of Wauseon, Ohio.

Upon motion, a Nominating Committee of seven were appointed by the chairman—Mr. Persons, Mr. Davis, Mr. Poole, Mr. Edwards, Mr. Hubbel and Mr. Brailey. Mr. Griswold, as chairman, reported the following nominations:

For president, George R. Fuller, of Rochester; first vice-president, Howard Hendrickson, of Albany; second vice-president, J. H. Scofield, of New York City; secretary and treasurer, J. B. Ware, of Buffalo. Executive Committee: H. H. Persons, of Buffalo; B. G. Hubbell, of Buffalo; S. B. Rawson, of Niagara Falls; Edward Davis, of Binghamton; T. H. Ferris, of Utica; J. S. G. Edwards, of Gloversville; J. S. Brailey, Jr., of Herkimer, and T. S. Lane, of Jamestown. Inspectors: C. H. Poole, of Utica, and C. O. Harris, of Rochester. The gentlemen nominated were unanimously elected.

Mr. Ferris, in the name of the Utica Home Telephone Company, invited the delegates and their friends to be present at a reception to be given at the company's exchange at 7:30 P. M.

Martin Carey, attorney for the Frontier Telephone Company of Buffalo, was called upon for a few words, and in a felicitous speech, explained the sentiment of his company. He was followed by former Senator Persons, vice-president and general manager of the Frontier Telephone Company of Buffalo. Mr. Potter then read a paper on "Uniformity in Toll Service." Mr. Ware gave a short talk on telephone development in the East, and the meeting was adjourned until 7:30 P. M.

EVENING SESSION.

At the evening session, which was held in the Home Telephone Company's Exchange, the report of the Committee on Amendments was adopted, which provided that the annual meeting be held the first Thursday in June; and that the annual dues be payable the first of January each year.

The Utica Telephone Company then provided refreshments and extended to the visiting telephone men the courtesies of the exchange. The meeting adjourned early in the evening, but many of the delegates were guests of the Utica Company until a late hour.

Among those present at the convention were:

S. A. Coe, secretary and treasurer Orleans County Rural Telephone Company, Lyndonville, N. Y.; Charles H. Poole, Utica Home Telephone Company; T. Harvey Ferris, Utica Home Telephone Company; W. D. Fuller, Norwood Telephone Company, Norwood, N. Y.; B. H. Brownell, president Rural District Telephone Company, Morton Telephone Company, Buffalo, N. Y.; J. B. Ware, Inter Ocean Telephone Company, Buffalo; B. G. Hubbell, president of the Consolidated Telephone Company, Inter Ocean Telephone and Telegraph Company, Geneva Telephone Company, Utica Telephone Company, Corning Telephone Company, Penn Yan Telephone Company and other exchanges; F. H. Sudro, Citizens' Stardard Home Telephone Company, New York City; J. F. Spockwell, Ontario Telephone Company, Oswego, N. Y.; J. A. Crawford, Franklin County Teelphone Company and Racket River Telephone Company, Hamden, N. Y.; J. S. Edwards, Glen Telephone Company, Johnston, N. Y.; E. C. Aiken, president Auburn Telephone Company, Auburn, N. Y.; E. L. Barber, Rome Telephone Company, Rome, N. Y.; J. S. Brailey, Jr., The Herkimer County Telephone Company; H. H. Persons, Frontier Telephone Company, and Haines Telephone Company, Buffalo, N. Y.; Boyd McDowell, secretary Elmira Telephone Company, Elmira, N. Y.; Wm. C. Geer, Rensselaer Telephone and Telegraph Company, Troy, N. Y.; W. Lewis Burk, Saratoga Telephone and Telegraph Company, Saratoga Springs, N. Y.; F. M. Brush, Cohoes, Waterford Home Telephone Company, Elyria, Ohio; J. Fagen, secretary County Telephone Company of Herkimer; J. H. Griswold, West Shore Telephone Company, Catskill, N. Y.; Howard Hendrickson, Albany Home Telephone Company, Albany, N. Y.; H. J. Prince, Jr., Watervliet, Green Island Telephone Company, N. Y.; S. M. Strong, secretary and manager, Schenectady Home Telephone Company, Schenectady, N. Y.; F. E. Hicks, president Granville Telephone Company, Granville, N. Y.; Jno. A. Driscoll, Seneca Gorham Telephone Company, Ontario County, N. Y.; D. Odell, manager The Rome Home Telephone Company, Rome, N. Y.; J. B. Marquis, Jr., Marquis Telephone Line, Norwich, New York; F. A. Smith, manager New Berlin Telephone Company, New Berlin, N. Y.; Geo. G. Otis, secretary Colonial Telephone Company, Newburgh, N. Y.; W. W. Capron, treasurer, Oneonta Telephone Company, Oneonta, N. Y.; Sam B. Rawson, Independent Union Telephone Company, Elmira, N. Y.; J. H. Griswold, Dunkirk Home Telephone Company, Dunkirk, N. Y.; W. H. Kelley, manager Newark Telephone Exchange, Newark, N. Y.

MANUFACTURERS REPRESENTED AT THE UTICA CONVENTION.

Evan Shelby, Sterling Electric Company, Lafayette, Ind.

S. C. Platt, Kellogg Switchboard and Supply Company, Chicago, had an exhibit of the company's goods at the Baggs Hotel.

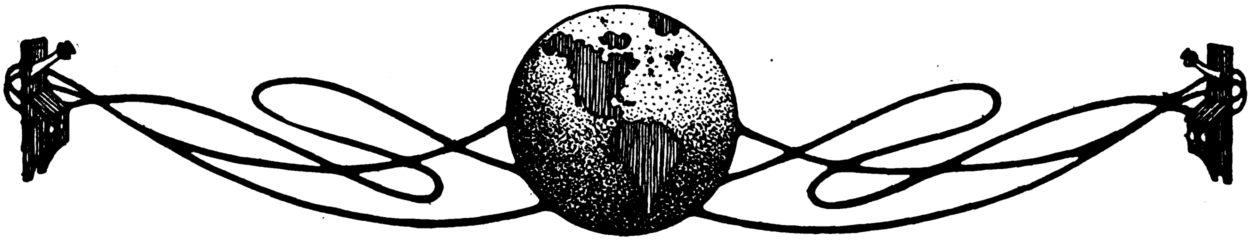
G. H. Miller, of Norwalk, Ohio, had a line of Miller guy anchors on exhibit.

William G. Mills represented the American Novelty and Manufacturing Company of New York City.

The North Electric Company of Cleveland, Ohio, was represented by Raymond Hendrickson with a line of the North apparatus. He gave the friends of the company a neat little gold-plated telephone transmitter arranged in the form of a button.

John H. Reed represented the American Electric Telephone Company.

George H. Pierce and Eugene L. Brown had wired up and in working order a full line of Stromberg-Carlson telephones. The telephones were wired into the Home Telephone Company's new exchange, and over them one could talk to any part of the city. When a visitor wished to see a switchboard of this manufacture he was taken to the new Home Exchange, where the Stromberg-Carlson Company has very recently installed a ten section central energy board. A new lock-out device being put on the market by this company attracted considerable attention.



FOREIGN CURRENTS

By "The Arrester."

ONLY a few weeks ago reference was made in these notes to the rarity of telephone papers at the meetings of the English Institution of Electrical Engineers. The telephone had its evening early this month when a paper was read by Mr. W. Aitken, entitled "Divided Multiple Switchboards: An efficient Telephone System For the World's Capitals." Mr. Aitken's paper advocates the adoption of very large exchanges serving districts five miles in diameter, each exchange to be equipped with two or three large multiple switchboards, the subscriber's station apparatus provided with means for calling at will on any of the switchboards in the exchange to which he is connected. The divided multiple switchboard originated with Mr. Milo G. Kellogg, and was first tried at St. Louis on the magneto system. Mr. Aitken has developed the idea still further by working out circuits for selective calling from the subscriber's station which will combine effectively with any of the standard common battery systems. Hence his claim to have produced an efficient telephone system for the world's capitals. The inhabitants of those cities ought to be very grateful to Mr. Aitken for some of the world's capitals are sadly in need of what he promises them.

Weak Point of Trunk Working

Mr. Aitken points out that the problem solved in the title of his paper is one that bristles with difficulties. Any system proposed must be as simple as possible, consistent with efficiency—quick, direct, reliable. The general practice has been to divide the area to be telephoned into sections, to place in each section an exchange, to connect the various exchanges together by direct junction wires where the traffic is considerable, and to connect the various exchanges or groups of exchanges also to one or more junction centrals through which connections are obtained to small exchanges where the traffic is not sufficient to warrant direct junctions being run so that complete intercommunication may be established. Such a system is illustrated, serving 115,000 lines from 37 exchanges the largest exchange having 15,000 lines. The weak spot of such a system is the multiplicity of junction calls. (Note: Junction is the English term for local trunk). Only a small proportion of the total calls can be dealt with direct by one operator. In the larger exchanges 50 per cent. of the calls may be local, but in the majority of cases the percentage will be much smaller, in some cases only 5 to 10 per cent. Fifty to 95 per cent. of the calls have, therefore, to be handled by two—in some cases three—operators. The service is not therefore ideal. The call has to be passed from exchange to exchange, and a junction call takes about twice as long to complete as a local one.

Mr. Aitken's Conclusions

Mr. Aitken proceeds to expatiate on the delays, complications and disadvantages of "junction" working and to describe the various methods in use for operating trunk wires in large systems, describing both the Western electric common battery circuits and those of the Kellogg Switchboard and Supply

Company, which are considerably simpler by reason of employing only two wires in the switchboard circuit instead of three. Taking a hypothetical case of two large exchanges of 10,000 lines each, Mr. Aitken finds that 1,500 junctions are necessary, requiring at each exchange 30 "B" positions of 25 lines each, making for junction working 20 sections of switchboard in all and the services of 60 operators and 6 supervisors. The system of divided multiple board advocated by Mr. Aitken has only been urgently required of late as formerly the great cities were sufficiently telephoned with comparatively small systems. Now, however, systems of 100,000 subscribers may be looked for in the large cities and the recent progress in underground construction has made possible the proper disposal of these large numbers of circuits.

The Divided Multiple Exchange

By a divided multiple exchange is meant an exchange divided into two or more groups, each group having a multiple of a proportion only of the total subscribers' lines, each subscriber having the power of calling each of the groups at will and obtaining connection with the subscribers multiplied thereon without the intervention of a second operator. The idea is to abolish trunking lines as far as possible. The multiple of each switchboard or division is made as large as can conveniently be reached by the operator. The co-operation of the subscriber is called on by giving him the selecting of the group of switchboards on which the line wanted is connected. Two or three push buttons or switches are fitted in combination with the ordinary subscriber's instrument, one, say, labelled 1 to 10,000, the second 10,001 to 20,000, and the third 20,001 to 30,000, or in other suitable divisions. In addition to taking the telephone from the switchhook the subscriber has to press the button of the group in which is the number required; he then gets the connection direct instead of as in the junction system, the first operator having to ask a second to assist her in completing the connection in a large proportion of the calls.

The Working of the System

The central exchange on a divided system consists really of two or more great multiple switchboards serving a large area, and its total capacity may be from 30,000 to 60,000 lines, according to the size of the units and number of divisions. Instead, however, of having trunk lines between the exchanges, the subscriber's line is branched to each division, and has a calling signal and answering jack on each, so that it can be connected to each of the multiples of the several divisions, his own line being multipled on one of the divisions so that other lines may be connected to it. The subscriber can therefore greatly expedite the rate of operating for a great proportion of his calls and at the same time he enables the operator to perform more work, as a second operator more rarely intervenes. A proportion of junction working will still exist to the exchanges more distant from the centre, but in most instances it will be possible so to design a system that 75 per cent. of the possible junction working will be eliminated. Mr. Aitken shows a system of 115,000 lines served by 15 exchanges, of which the three major having divided multiple boards serve areas 5 miles in diameter and contain between them 95,000 subscribers' lines or 83 per cent. of the total.

Mr. Aitken's Plan

The paper proceeds to explain the circuits Mr. Aitken has devised to adapt the selective calling principle to common battery working. These are too complicated to attempt explanation of them without the diagrams. The principle has been adapted to that curious British survival the "ring-through" system, to the common battery system of the Western Electric Company and to that of the Kellogg Switchboard and Supply Company. The following is Mr. Aitken's proposal for an efficient world's telephone system with divided multiple boards. A huge central exchange of from 30,000 to 60,000 lines in the heart of the city serving an area of about 14 square miles. Four main conduits would radiate from the centre each containing 50 to 80 ducts, branching out as required up to a distance of from 2 to 2½ miles from the exchanges. Outside this area say 3½ miles distance from the central, subsidiary exchanges should be formed. When these exchanges were of considerable size they would have direct junction lines to the central, and incoming junction sections on each of the three multiples of the central exchange; where, however, the junction lines were few the operators would call the multiple required at the central by pressing the corresponding key in the same way as a subscriber.

Some of the Dimensions

The outgoing junctions for the subsidiary boards would be multipled over only one group of boards at the central, the subscriber always pressing the button corresponding to that group when requiring a junction connection. The dimensions of the switchboards are rather on the big side. The multiple sections would be 6 ft. 3 in. long and the multiple jacks would be about 2 ft. 10 in. A startling feature of the divided multiple board is that each operator is to have 533 answering-jacks and line lamps (she only receives one-third of each subscriber's calls on a three-division board) and these would occupy a height of 11 inches so that the top row of multiple jacks will be 45 inches above the keyboard. (Whether they be dark or fair, Mr. Aitken's operators will certainly have to be divinely tall.) The group containing the outgoing trunk jacks would have to have a smaller number of subscribers' lines or a longer section.

BELL ATTEMPTS TO DEMORALIZE U. S. COMPANY'S FORCE

THE Central Union Telephone Company, the Bell licensee, which operates in Ohio and several other of the middle States, is endeavoring to meet the competition of the Independent toll lines, which are now being constructed in this section of the country to such an extent. In doing this it is resorting to all sorts of schemes by which to hurt its Independent opponents. The State of Ohio has been flooded with special agents selling Bell toll line coupons, and advertising the Bell long distance service. Rates have been cut between various points and new efforts have been made to convince the pubic that the one-minute is as satisfactory as the three-minute rate.

This warfare has by no means been confined to such legitimate methods as these. Stories are coming from Cleveland to the effect that the Bell has, in several cases, endeavored to demoralize the force of the United States Telephone Company, the long distance branch of the Federal Company. In one case, a Bell official went into an office in which a young woman is employed as a branch switchboard operator. She operates both the Bell and Independent switchboards, but is employed by the United States Company. The Bell official represented himself as an agent of the United States Company, and endeavored to learn from her the amount of business the United States is doing on several of its lines out of Cleveland. The operator, however, became suspicious and called up the office of the United States Company in an endeavor to identify the alleged United States official, whereupon the Bell agent beat a hasty retreat.

Another instance was where an operator, working for the Bell, had a sister employed by the United States Company. The traffic manager of the Bell, in Cleveland, asked this young woman to get for him through her sister information concerning the United States Company's business. She was very busy at the time, and replied that she would see about it, or words to that effect. The next day the traffic manager asked her for the information, and she replied she could not get it for him—that she was as much interested in one company as the other, and that she did not propose to be spying on the company that gave employment to her sister. That afternoon she received her dismissal, the reason given was that she had told a falsehood to the traffic manager in saying she would get the information, and not doing it.

CONVENTION OF FARMERS' ASSOCIATION.

By Wm. H. Elges, *Special Correspondent.*

THE Farmers' Telephone Association of Lewis County, Mo., held a meeting early in June at the Grange Hall in Weber, Mo. This Association comprises all the Independent telephone companies south of the county seat. Representatives from nearly all the rural companies in the county were present, although a few were kept away by the high water, and impassable roads.

This meeting was a continuation of the adjourned meeting which was held recently at Sellers, Mo., at which the Association was formed, and an account of which appeared at the time in The American Telephone Journal. The principal business before the meeting was the adoption of a constitution and by-laws, and to sign a contract for mutual working for five years. There was also a strong sentiment in favor of fixing a uniform charge for all messages, but no action was taken along this line.

G. A. Armstrong, chairman of the committee on constitution and by-laws, made a partial report, after which the constitution and by-laws submitted by the committee were adopted.

C. O. Raines, read a form of contract to be signed by the various companies for mutual operation, violation of which subjects the offending company to an assessment of 50 per cent. of its capital stock. A motion was made and adopted that these regulations be printed for distribution among the various companies.

A committee of three consisting of E. F. Westhoff, B. S. Bozarth and J. F. Gnuse was appointed to secure exchange into Quincy.

The five-year contract was then signed by the following representatives of companies present: Fred Prisner, Lindale Telephone Company No. 1; John T. Bower, Sr., Lindale Telephone Company No. 2; J. D. Loudermilk, Highland Telephone Company; George A. Armstrong, Wyaconda Telephone Company; B. S. Bozarth, Bozarth Telephone Company; E. T. Westhoff, Prairie Telephone Company; William H. Jennings, Canton & LaGrange Telephone Company; John Stevenson, Cox Telephone Company; Henry Gnuse, Garkie Telephone Company; C. O. Raines, Citizens Telephone Company of Northern Missouri; A. Guseman, Guseman Telephone Company; A. J. McClain, Wyaconda and Williamstown Telephone Company; H. B. Burgess, Burgess Telephone Company; J. H. Steward, Steward and McClain Telephone Company, and C. H. Walker, Williamstown and Pleasant Hill Telephone Company.

The association then adjourned to meet at Weber the second Saturday in June, 1904.

BELL COMPANY MAKES SIGNIFICANT MOVE.

INDIANAPOLIS, Ind., is to be the headquarters of the Central Union (Bell) Telephone Company. Within a short time the entire office force, supply department and shops of the company will be moved from Chicago, where they have been heretofore. The company will also practically take its entire force to Indianapolis.

The reason given by the officers of the Central Union for changing the headquarters of the company from Chicago to Indianapolis is that Indianapolis is more centrally located in its territory, and that the officials will thus be better able to keep in close touch with the company's affairs. Many improvements in the various Central Union exchanges are promised as a result of the move.

This explanation is partly true. But the real reason is to be found in the winning fight being waged by the Independent telephone companies in the Central Union's territory. This condition of affairs has been recognized by the officials of the Central Union for some time, and as a last resort the company's management is to be moved into the center of the fight. The New Telephone Company of Indianapolis is rapidly outdistancing the older company, and this is true of other Independent companies all over the states of Indiana, Illinois and Ohio. Independents in this territory have known for some time that the Bell Company was preparing to make an extraordinarily strong fight to regain its lost prestige. They have not been idle in the meantime, and have prepared themselves to resist any new move made by the Bell. The changing of the headquarters to Indianapolis is regarded as the firing of the first gun of battle.

CITY DEMANDS DEPOSIT.

THE Canadian Machine Telephone Company recently applied for the privilege of constructing lines on certain streets of Ottawa, Canada, for the purpose of demonstrating the practicability of its system. The finance committee of Ottawa at first insisted that the company deposit $5,000 to cover any damage that might occur from the wires of the company. Upon the representatives of the telephone company explaining that their wires were in no way dangerous, as they carried no heavy currents and that the company was not going into a commercial enterprise, but intended only to demonstrate its system, the amount of deposit was reduced to $3,000. The company received the privilege of operating for twelve months in order to demonstrate the practicability of its system. It must, however, commence operations within three months, or forfeit its franchise.

TELEPHONING WEATHER REPORTS.

MR. GEORGE M. CHAPPEL, of the Des Moines, Iowa, branch of the United States Weather Bureau, recently sent 644 letters to the prominent telephone companies of that State, asking them to co-operate with the Department of Agriculture in the distribution of daily weather forecasts. In this way Dr. Chappel thinks that the special warnings and forecasts could be made to reach the maximum number of farmers, stock raisers, business men and others to whom the information would be of the utmost value. Following is a portion of the letter, which will make clear the request:

"I write to ask you if you would not be willing to co-operate with this bureau in disseminating the forecasts over your telephone lines in case the chief of the bureau will supply you or an agent designated by you with a copy of the forecasts."

The forecasts, which are made in Chicago at about 9 o'clock a. m., should reach Iowa points at 10 o'clock, a. m. This means that if the telephone companies comply with the request of the bureau—and they undoubtedly will—that every farmer having a telephone which is on a line running to one of the information distributing points, will be in possession of the weather forecast for the day before the day has well started, and will be able to plan his work accordingly.

The usual method of distributing the information is for an operator detailed for the purpose to give a distinctive call on a line which will bring every subscriber that cares to hear the report to the telephone. She will then repeat the forecast for the day. The goal that the government is aiming for is to enable every farmer to know what the weather will be for the thirty-six hours to come and to be able to give him this information every morning. There appears to be no reason why it will not be possible to do this if the telephone companies give the proper assistance.

It is reported on good authority that already many companies in the State are aiding in the work by performing the function just described, but that there are yet something like 500 more that will have to be included in the system to make it perfect.

MILWAUKEE RY. ADOPTS COMPOSITE CIRCUITS.

SUPERINTENDENT of Telegraph Urias J. Fry, of the Chicago, Milwaukee & St. Paul Railroad, will equip one hundred and twenty-seven miles of his telegraph line between the towns of Marion and Perry, in Iowa, with simultaneous telegraph and telephone apparatus. Mr. Fry witnessed some very successful tests of this system at the recent convention of Railway Telegraph Superintendents in New Orleans, which demonstrated its practicability. Since returning he has decided to give the system a trial. If the installation proves satisfactory it is probable that all of the lines belonging to the railroad will be similarly equipped.

TELEPHONE DEVELOPMENT IN INDIANA.

By R. D. Fisher, *Special Correspondent.*

NEARLY two hundred Independent telephone companies in Indiana have reported to the State Tax Commissioners their relative improvements and extensions during the past year. It is estimated that the poleage and mileage of wire has increased at least one-third over the previous year.

These yearly reports give the amount of capital invested, the gross and net income from all sources, the number and kind of switchboards, number and kind of telephones in use, the number and kind of poles, average cost thereof and how long in use, the miles of and kind of wire used, average cost, etc.; the amount expended in improvements and other expenses and the amount paid for material for wages to employes and salaries to officers are also required.

There are forty-seven more companies reporting this year than reported in June 1902, and next year will show a much larger increase, as nearly a hundred companies have incorporated since the first of the year.

NEARLY 800 TELEPHONES IN 4,300 TOWN.

IN operation but five months, and now having nearly 800 telephones in service in a town of 4,300 population, is the record of the Independent Mutual Telephone Company, of Shenandoah, Iowa, of which W. F. Broeksmit is secretary, treasurer and manager. Mr. Broeksmit has just issued a new directory showing the town and rural subscribers of the company, and also the toll connections with numerous Iowa towns.

This record has beeen made in the face of keen competition on the part of the Bell Telephone Company, which has had an exchange in Shenandoah for several years, but has never until lately done anything towards giving a satisfactory service, or increasing its subscription list.

More orders for telephones are coming in than the Independent company can possibly attend to, and at a recent meeting of stockholders they voted unanimously to increase the capital stock to $100,000. With this new money, extensions and improvements will be pushed so as to take care of the new business coming in.

The company has constructed one hundred and thirty miles of pole lines, on which over three hundred miles of wire have been strung. One of the Shenandoah newspapers, in commenting on the phenomenal success of the Independent Mutual Company, says:

"The proposition is a splendid one, both from the standpoint of the investor and the user. Rates and service have materially improved and Shenandoah has been put in touch with all the country for ten miles around. A map of the telephone lines owned by this company shows that every road of any importance is occupied by it."

In the rural sections, the company has 330 telephones installed in addition to which there are three rural lines, with nearly fifty subscribers, who built and own the lines. They are connected to the exchange of the company, and have free service with all its subscribers.

The company is planning now for the construction of a copper metallic toll line which will give connection to points in Missouri, including St. Joseph, Kansas City, and also points in Northwest Missouri, Northeast Kansas and Southeast Nebraska, including South Omaha.

WHAT THE STARK COUNTY COMPANY IS DOING.

FULLY eighty thousand dollars will be spent in the next three months by the Stark County Telephone Company in its Canton, Ohio, exchange. In addition to this, large sums of money will be spent in extending the lines to all parts of Stark and other Ohio counties.

The improvements in Canton are now under way, a large force of men being at work and nine carloads of supplies having been received by the company.

Since it began operation in Canton, a few years ago, the Stark County Company has had a marvelous growth. With high-class service and consistently low rates, business came to the company in such volume that extension after extension to its original switchboard capacity was necessitated.

Manager Hillhouse, in regard to the company's prospects, said recently: "Our company will have a capacity of 3,500 telephones after the improvements now on are completed. We could have nearly that number of subscribers connected if we had the line and switchboard capacity at present."

The toll line extensions planned for this season will take in Middlebranch, Congress Lake, Hartville, New Baltimore, Uniontown, Greentown and all points in Northern Ohio. The Sparta line will be extended to Waynesburg, Magnolia and other southern points, connecting with other Independent lines and thereby giving a first-class long distance service with hundreds of other Independent exchanges. As soon as lines now building in New York State are completed the Stark County Company will have connection with New York State Independent exchanges. St. Louis and Indianapolis connections will also be established in a short time.

UNITED COMPANY CONTINUES TO IMPROVE.

THE United Telephone and Telegraph Company, of Philadelphia, Pa., has recently been improving and reconstructing its system, and considerable new work has just been completed.

Two No. 10 copper wire trunks for toll-line business have been constructed between Harrisburg and Philadelphia, and are now in service. The United company now reaches over its toll lines to Hagerstown, Md., Chambersburg, Pa., and all points in the Cumberland Valley; also Pottsville, Sunbury and points in the anthracite coal regions. A large new toll board is being installed at Harrisburg, Pa., which city will be a central point of distribution for the toll lines of the company.

All toll lines of the company were recently tested, such measurements being made as would be of value in transposing and balancing them. The work of transposing and balancing has been completed, which puts the United Company's lines in as good shape as any similarly situated toll lines in the country.

The United Company's system is composed of many small companies, which were absorbed and which were built before the Independents had learned to appreciate the economy of high-class construction. When the United Company acquired the smaller systems it found it necessary to practically rebuild many of them.

A private branch exchange, connecting with the United Company's lines, is soon to be installed in the Standard Steel Works of Burnham, Pa. Chambersburg, Pa., is to have a new 640-line common battery board, which the United Company recently contracted for.

INCREASES ITS PATRONAGE.

THE York State Telephone Company, of Elmira, N. Y., formerly the Elmira Telephone Company, has issued a new directory, which contains more subscribers' names by 175 than any list that has heretofore been published by any telephone company in the city of Elmira. This company now furnishes free service to its subscribers to Elmira Heights and Horseheads, in both of which places the company has an extensive list of subscribers. The company recently extended its lines to Bohemia and is now giving exclusive service to that point.

The Editor's Page

A NASTY TRANSACTION EVEN FOR THE BELL

In another part of the paper is told the story of how the American Bell Telephone Company secured control of the majority stock of the Kellogg Switchboard and Supply Company. The facts as set down in this account have been all carefully verified by the editor of this paper, and in order that there might be no inaccuracy or exaggeration the editor himself prepared the history of the transaction. It would be difficult to find a parallel for this extraordinary "business deal." Some very nasty things are done at times by corporations and individuals engaged in business rivalry and warfare. But generally the line is drawn at some point that leaves the parties to the action still within the pale of decent citizenship.

It remains to be seen whether after the facts become generally known these men can continue on a friendly footing with the business men in the communities where they live. If they can, then it is surely time for a general revision of our code of business morals.

It has been suggested that this transaction might properly be regarded simply as a "sharp business manoeuvre," as merely taking advantage of a business rival. Such a suggestion can come only from persons who do not know all the facts, or else from persons who believe that it is legitimate to do anything, no matter how immoral, if money can be made and the criminal laws evaded. That kind of a code fortunately has few adherents. Most men, no matter how eager their craze for riches, like to feel that their money has come to them legitimately.

No one could very well have found fault with President Fish and his partners in this deal if they had purchased the Kellogg stock openly, or had announced the fact of the purchase shortly after it had been consummated. Instead, they bought under a distinct agreement that the transaction be kept secret, and for a year and a half it has been kept secret. In the meanwhile the Kellogg Company secured large contracts for equipment from Independent telephone companies that are opposing the Bell licensees in the field. The engineers and salesmen of the Kellogg Company were kept in ignorance of the sale with every one else. In fact, they were treated even worse than the others, for they received lying assurances from sources they were justified in trusting, that the rumored control of the Bell was utterly without foundation. And in perfect good faith they passed these assurances on to their customers and friends. In this way they were made unwitting and unwilling agents for the sale of goods under false pretences. Fortunately for the Kellogg agents they are all men of sterling honesty and unblemished reputation, and in this unhappy complication they have the sympathy and good will of every man in the Independent field.

Of course the object of this manoeuvre on the part of the Bell people is plain enough. They hoped to tie a lot of Independent companies to the use of apparatus that could not be extended or renewed, leaving them high and dry by winding up the affairs of the Kellogg Company.

WHAT THE KELLOGG COMPANY SALE MEANS

Fortunately a few factors have been overlooked by the conspirators, and out of these will come the nullifying of the whole ugly business. In the first place Mr. Kellogg, instead of consenting to the miserable things done in his name, is using his best endeavors to upset the conspirators' plans. In the second place, the minority stockholders, most of whom are employes of the company, are a band of valiant fighters, and it is more than probable that they will succeed in their efforts to secure the annulment of the sale. And finally should these two forces fail, there will be apparatus in the field very soon that will be interchangeable with the Kellogg apparatus, so that any of the Independent companies who were equipped by this corporation will have no difficulty in getting anything they want for renewals or extension. Owing to the continued rumors of Bell control in the Kellogg Company, a number of competent men went to work months ago on plans that would meet such a contingency by devising apparatus that interchanges perfectly with the Kellogg, and The American Telephone Journal has assurances on which it relies that this apparatus will be available on very short notice.

Finally, the Bell control of the Kellogg Company, even if it should be sustained by the courts, an extremely doubtful conclusion in view of the offense against public policy, carries with it no control of any Independent operating company. Every one of the companies equipped by the Kellogg people are under the domination of stockholders who are consistently hostile to the Bell and who could not be persuaded to consolidate with the Bell licensees. In this they have first the incentive of civic pride and good citizenship, the factors that have been the bulwark of the Independent movement. Then they have the further incentive of good business men, for the Independent companies are generally built on sound investment, whereas all of the Bell companies are loggy with watered stock.

Altogether, therefore, the situation promises the usual outcome when the Bell applies its underhand methods. Its officers, when the smoke clears, will find that they have paid out their stockholders' money for a soap bubble. Transactions like these, while they may be temporarily annoying and embarrassing, will in the end be the best thing that could be devised for Independent prosperity. The Bell Company always pays dearly for these shadowy and temporary triumphs, and in the end its finances will be wrecked by such expenditures. Three of its greatest licensee companies—the Michigan, the Erie and the Central Union—have already succumbed to this sort of reckless work. The parent company, which in the end always pays the undertaker's bills of its licensees, may come next. Unless its officers have a sudden and unexpected visitation of sense, the news may go over the wires one of these days that the "American Telephone and Telegraph Company is in the hands of a receiver." That would be the final solution of the "telephone problem," and as matters are drifting it will be the inevitable solution if the Bell directors persist in attempting to stay opposition by pouring out money to buy off their competition.

CONTEMPORARY CROSS TALK

By "The Listening Key."

THERE is one deduction above all others to be drawn from the operating figures given by Mr. Sherwood, which were quoted and discussed recently. And that is that the common battery system is the only system of telephone operating that the modern telephone manager can adopt, in justice both to the public and to his stockholders. It is clear that the automatic system, call it what you will—common battery, central energy, relay or what not—is the simplest and quickest of all methods of telephone operating that have been devised, and that it not only gives the best service to the user—in that it is simple and easy to use and quick—but it so accelerates the speed of operating and so increases accuracy, that it affects most important economies in the use of the plant and in operating expenses. Therefore the relay system—to use the shortest term—is bound to be the telephone system of the future for every plant of any greater importance than that called for by the mere village. Its greater first cost than any indicator system or system employing local batteries will not be allowed to weigh as an objection and cannot long postpone its general adoption.

Finality Not Yet Reached

Not the most ardent admirer of the relay system would argue that with the central battery, and the obedient phalanx of relays that faithfully observe its slightest request, finality has been reached in telephone exchange working. On the contrary, we may expect to see many improvements and advances in the direction of simplifying the circuits and auxiliary apparatus of the relay system. But to a certain extent and in various directions finality *has* been reached with the relay system. For example, we have taken away the battery from the subscriber's station, and you may bet the lower side of your ultimate bottom dollar that we shall never put it back there. Tons of glass, mines of zinc, vast stores of carbon, mountains of bichromate and rivers of mercury will, in the oncoming ages, find other uses, that but for the relay system would have been made up into cells for telephone purposes. Also have we removed from the subscriber's station, nevermore to be replaced there, the magneto generator.

Automatic Signals are Final

But in one other important point the relay system has touched finality; that is, in the automatic signaling of the exchange. In the relay system, as soon as the subscriber takes the telephone off the hook a lamp at the exchange lights indicating his call. The lamp is alight the instant the receiver is lifted and the hook rises, and while the receiver is on its way to the subscriber's ear, the operator's plug is on *its* way to the answering-jack. Often the operator is answering the call at the moment the subscriber places the receiver to his ear. Now, as long as the subscriber has to remove the telephone from its place of rest in order to use it, no method of signaling the exchange can be quicker and more automatic than this method of causing the release of the hook to close the circuit governing the signal. The removal of the telephone and the glow of the line signal at the exchange are simultaneous. It is the same with the signal to disconnect. The replacement of the telephone simultaneously causes the disconnection signal to glow, and the proper replacement of the telephone, while not an absolutely necessary act in the sense that taking down the telephone for use is, is one so habitual and so obvious that it is very rarely neglected. In this instance again we have touched finality, for nothing can be more automatic or quicker than the control of the disconnection signal by the replacement of the telephone.

Automatic Signals Not Original

Curiously enough, this principle of causing the removal and replacement of the telephone to effect the calling and disconnection signals is not strictly original with the common battery system. The method was in use in Europe in the early eighties, long before central energy became a practical part of telephony. Telephone men who have in their libraries a copy of "The Telephone," by Preece and Maier, or of the "Manual of Telephony," by Preece and Stubbs, will find in either work a description of the English Post Office system of exchange working. This system gave automatic calling and clearing by the removal and replacement of the receivers. A constant current was kept on the subscriber's line from a battery of Daniell cells at the subscriber's station and this constant current kept the line indicator energized; when the receivers were lifted—English Post Office telephones had two receivers, or two tubes branching from a receiver placed in the transmitter case—the current was interrupted and the line indicator shutter dropped. Each line was also connected to a galvanometer indicator which, by the positions of the needle, indicated whether the telephones were on or off their hooks. The indicator needles of two lines connected remained vertical, but when the subscribers replaced their telephones the two needles were deflected, thus giving the signal for disconnection. The English Post Office system was naturally expensive in battery power, and in switchboard space, and was not calculated to survive to the days of large exchanges and heavy traffic.

There is a Distinct Difference

It might be asked, if the English Post Office engineers adopted automatic signalling twenty years ago, and if their example was not generally followed, how can you say that we have reached finality now, simply because we have returned to automatic signaling after years of trial of other methods? That looks off-hand like a good point, but there is nothing in it when you come to examine it. The English Post Office system did not survive and was not developed along the lines on which it was started partly because it was too expensive for those days and partly because it was not pushed. To keep up constant current batteries at every subscriber's station was an expensive job, and to keep up lines that would give results on closed circuit was even more so. Telephone companies in the eighties and early nineties were not working on those lines. The English Post Office never did an active telephone business and did not push or develop its system. If it had, we might have had the relay system earlier than we did. But to make automatic signaling a commercial success, central energy was necessary; to talk commercially by means of a central battery a battery of low internal resistance was necessary, and to make the whole system a thorough success efficient lamp signals were almost as necessary as the central battery itself.

A Very Different Method

Therefore, although in automatic signaling we have but reverted to the principle adopted by the British Post Office twenty years ago, we carry out the principle by a very different method, a method that commercially and technically gives us a thoroughly satisfactory system of telephone working. From the lamp signal and the central battery there will be no going back, and on the principle of automatic signaling for calling and clearing there can be no improvement. So that it is quite fair to say that in certain directions we have reached finality. Improvements in details, as I said before, there will be, but on the general principles of automatic working and central energy there can be no improvement. It is doubtful if there can be any improvement in principle in the lamp signal—unless some change takes place in the human eye. The efficacy of the lamp signal is dependent on a scientific fact—that the eye is vastly more sensitive to changes in light than to changes in color or form. Not a very scientific explanation by the way, since color and form to the eye are both dependent on light, but sufficient to illustrate my meaning. So it is difficult to see how a more effective signal than the lamp signal can be devised, and perhaps in that direction also we may have reached finality.

The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

STOCKHOLDER FORCED OUT OF COMPANY RECOVERS DAMAGES.

ZEPHANIAH HEAPS, of Belair, Md., recently received redress in the courts for what he alleged was a gross fraud to force him out of the Highland Telephone Company of Maryland and buy his stock at a price greatly below par. He sued Parker F. Scarborough, Hugh T. Heaps, Thomas J. Brooks and Fred N. Ramsay to recover the difference between the par value of twenty-seven shares of stock held by him in the telephone company and what he actually received for them. The testimony showed that the defendants were directors in the company and owners of the whole of the company's stock, the par value of which was $50 per share. The stock was quite profitable and paid large dividends. In August, 1901, the plaintiff received notice to meet the other directors and defendants at Mill Green to confer on telephone business. At this meeting the plaintiff was told that the company's general manager, F. N. Ramsay, had a purchaser for the company at a reduced rate and wanted an option that he might make the sale. The plaintiff refused to sell at the price offered, and asked for one day's time to have a full meeting, when Mr. Ramsay might be present. This request was agreed to, and on the next day Mr. Ramsay came to the meeting and announced that neither of the other three directors would be present, as they had all sold their stock and did not think it necessary to come. He further said that if plaintiff was willing to sell he could do so on that day, but not later, as Mr. Ramsay now had the controlling interest. He, therefore, advised the plaintiff to sell his stock or it might become worthless if a rival company got control. Under these circumstances it was alleged that the plaintiff gave Mr. Ramsay the option and was later paid for the stock at the option price. Afterwards it was found that the defendants had purchased the stock themselves and owned the whole of it.

The defense denied the allegations of fraud, misrepresentation and intention to deceive, and claimed to have paid the plaintiff all the money he had invested in the enterprise and interest thereon to date of settlement, and that these payments were the full value of the stock sold at the time of the sale. After argument and deliberation the jury gave the plaintiff a verdict of $300.

A HOUSE CAUSES LEGAL COMPLICATIONS.

A HOUSE standing in the middle of a Des Moines, Iowa, street and impossible to move in any direction, except skyward, because of objections from various interested parties, presents a very complicated situation for the courts. The Des Moines City Railway Company obtained an injunction restraining the owners of the building from moving it in one direction, because it would interfere with their trolley wire. The Iowa Telephone Company intervened, asking that its owners be prevented from moving it in another direction because it would necessitate the cutting of the telephone cable that leads to East Des Moines, and thus discontinue service to that part of the city for some time. The owner of the lot objects to its being returned to its former foundation, and the city is unwilling that it should stand where it is.

ANOTHER LINEMAN SUES FOR DAMAGES.

HERMAN F. SCHMALTZ, of Wheeling, W. Va., has started suit in the circuit court of Ohio county against the National Telephone Company for $5,000 damages for injuries sustained while in the employ of the company. The declaration alleged the following facts: That the plaintiff in the performance of his duty as lineman for the company was stringing a wire from one pole to another; that on one pole there was a wire running to a nearby residence, the wire being connected to the insulator on this pole by about eight inches of tarred twine. As he was fastening the line to the insulator the tarred twine broke and the end of the wire struck him on the left hand, throwing him to the ground about twenty-five feet below. His right foot was broken below the ankle and the ligaments torn loose therefrom. He was confined eight weeks from the effect of his injuries, and will never be able to follow his vocation as lineman. The company's side of the controversy has not yet been presented.

MANAGER CONVICTED OF MANSLAUGHTER.

R. B. HALL, of Osburn, Mo., who was in charge of a gang of men constructing a telephone line between La Grange and Edina, Mo., for the Missouri & Kansas Telephone Company, was recently tried for shooting Samuel Anderson, convicted of mansalughter in the fourth degree and sentenced to three months in jail and a fine of $100.

MORE LITIGATION FOR CHICAGO COMPANY.

ANOTHER suit has been instituted attacking the right of the Chicago Telephone Company to charge more than the franchise rate of $125 a year for the use of its telephone for business purposes. Thirty business firms and individuals are complainants in the new bill.

CINCINNATI COMPANY FIGHTS FOR A FRANCHISE.

THE Cincinnati Telephone Company, having been refused permission by the city council to construct telephone conduits in the city of Cincinnati, has applied to the probate court for a franchise under a law giving that court authority to grant franchises when companies have been unable to agree with the city. The franchise asked for is to operate a telephone system in the city by laying underground conduits in the business district and stringing overhead wires in the outlying portions of town. Resistance was made to the granting of the franchise by the City and Suburban Telegraph Association, which was represented at the hearing of the application by counsel. The city solicitor was present, but waived his time in favor of the attorneys for the association.

The contention of the association was that the Cincinnati Telephone Company, having been refused permission to construct telephone conduits in the city by the council, was precluded from applying to the probate court for such permission. Counsel for the association further contended that stringing telephone wires overhead is now an out-of-date and obsolete method of telephone construction in a city like Cincinnati, owing to its wide streets and peculiar topography, and that it lies solely within the jurisdiction of the council to say whether or not the company shall string such wires or lay conduits. It was conceded that the probate court has authority to grant franchises to string overhead telephone wires where the companies have not been able to agree with the city, but it was contended that the method of stringing such wires was within the jurisdiction of the council. In case the court did grant a franchise to the company, the latter would have to seek the council's permission to lay its wires, and such permission having been refused the company would be powerless to do business. The business districts were now occupied by conduits, and it would be impracticable to lay a second system. The Cincinnati company's contention is to be presented later and a decision rendered.

LAWSUIT OVER CROSS-ARMS.

THE Maryland Telephone and Telegraph Company has filed a bill in equity in the circuit court at Towson, Md., against the Commissioners of Baltimore county and the Chesapeake & Potomac Telephone Company, asking that an injunction be granted restraining the defendants from interfering with the plaintiff's cross-arms on certain poles at Cantonsville. An order was issued requiring the defendants to show cause why the injunction should not be granted.

It appears that some time ago the county commissioners turned over the use of poles erected for the county fire-alarm system to the Chesapeake & Potomac Telephone Company. Subsequently the Maryland company secured permission to use some of the same poles. The Chesapeake company claimed ownership of them and asked the county commissioners to revoke the order granted the Maryland company, which was done. The latter claims in its bill of complaint that the commissioners had no right to revoke the order or give the county property away. The company also alleges that it has gone to considerable expense in placing its lines on the poles.

The answer of the Chesapeake company denies that the poles on which the wires were strung and on which the Maryland company placed its cross-arms are in any sense the property of the company, but say they are its own exclusive property and that, therefore, the Maryland company had no right to use them.

A RATE DECISION OF INTEREST AND IMPORTANCE

By W. L. Cary, Jr.

IN the case of Charles H. Macklin for himself et al. vs. Findlay Home Telephone Company et al., which originated in the court of common pleas of Hancock county, Ohio, it was held recently by Judge Schoffelberger that the attempt of the municipal authorities of the city of Findlay, Ohio, to fix rates for telephone rentals, although the ordinance fixing such rate was accepted by the telephone company by building an exchange under authority thereof, did not bind the company as to the rates to be charged. This case was appealed to the circuit court of Hancock county, which has affirmed the decision of the court of common pleas in quite a lengthy opinion by Judge Day.

The principle involved in this case is to my mind of far-reaching importance to Independent telephone companies in view of the present state of the law in most of the states. The great question in which most of the Independent companies are interested is, whether they may raise the rates for service after having accepted a municipal ordinance in which certain prescribed rentals are set forth, and whether they are not estopped to deny the right of the municipality to fix such rates, no statute having delegated such power to the municipality.

It has been held by a number of states that a telephone company under such circumstances having been granted the right to build its lines subject to the right of the municipality in the exercise of its police powers to fix the "mode of use and occupation," may refuse to accept the provisions of an ordinance fixing telephone rentals as part of such ordinance, and the telephone company may not be deprived of its right to build in such municipality by refusal of the municipal authorities to pass an ordinance fixing merely the "mode of use and occupation."

The case of Macklin vs. the Home Telephone Company was as follows: The company attempted to secure a franchise in the city of Findlay, but the passage of the ordinance was greatly delayed by the city council. An ordinance granting the franchise was finally passed containing a section prescribing the maximum rental for residence telephones at $12 a year. The company accepted the franchise and secured about 200 subscribers at the $12 rate. It then determined to construct a different kind of plant than the original plans called for, and publicly announced it would not receive any additional contracts for residence service at the $12 rate. It further announced that it would not construct a plant until it had at least 800 residence subscribers at an annual rental of $18. It secured some 800 subscribers at this rate and proceeded with the construction of its plant.

Suit was then brought by Macklin et al. on the ground that the company was violating the provisions of its franchise ordinance and was discriminating in its telephone rentals. Judge Day in his opinion decides that the company is not bound to furnish service at the $12 rate, and in view of the fact that the company publicly announced it would receive no more $12 contracts and refuses to renew expired $12 contracts, it is not discriminating unfairly in its rentals. In his decision the Judge says:

> The franchise or right of a telegraph or telephone company to occupy the public streets and alleys of a municipality and use the same for the purposes of "constructing lines from point to point, by the erection of the necessary fixtures, including posts, piers and abutments necessary for the wires," is derived directly from the sovereign state by legislative grant contained in Sec. 3454, Rev. Stat., *et seq.*, to be found in Title 2, Chap. 4, under heading, "Magnetic Telegraph Companies." This right of use is absolute and subject only to the easement or right of the public to use the same public ways for public purposes, and the mode or manner of use by the company must be agreed upon between the municipal authorities and the company, and failing, that "the probate court shall direct in what mode a line shall be constructed along such street, alley, or public way, so as not to incommode the public in the use of the same," etc. See Sec. 3461, Rev. Stat. The right of use of the streets and public ways by the telephone company is wholly beside and independent of the municipality, and, of course, is to be enjoyed like any other right, without let or hindrance from the municipality, except in the proper exercise of its police power and the efficient discharge of the duty imposed upon it by the provisions of Sec. 2640, Rev. Stat., to "keep the streets, avenues, alleys, sidewalks, public grounds and bridges within the corporation open and in repair, and free from nuisance." Power to discharge the duty imposed by Sec. 2640, Rev. Stat., in connection with the construction of a telegraph or telephone plant is given by Sec. 3461, Rev. Stat., and is expressly limited to an agreement fixing the mode of use of the streets and public ways; and it would seem that the city's whole duty, in connection with the building of a telephone plant, is performed and its power in that behalf is exhausted, when it allows the company to use and occupy the public ways of the city with its "posts, piers and abutments" and other necessary appliances in the construction of its plant, in a mode of use agreed upon between the city and such company. No further or additional power is expressly given the council in this connection; nor do we think other power is clearly implied or in any sense necessary to the proper exercise of the power of police or the duty to keep the streets open in repair and free from nuisance. There appears to be nothing in the constitution or the laws made in pursuance thereof that confers upon the council of the city power to fix the price of telephone service in the city of Findlay. We think the city, under the law of this state, has no more right or power to set a price on telephone service than it has to regulate and fix the price of dry goods, groceries or other commodities in the same city. Perhaps the legislature of Ohio might confer such power on a municipality, but it has not done so, and the city is destitute of power in that respect.

The case has been appealed to the Supreme Court, and we may eventually expect an opinion which will settle this question so far as this State is concerned. In regard to the case of the Maryland Telephone and Telegraph Company, of Baltimore, Md., as to the right of the city and State to fix rates for telephone service, I believe the decision in the case of Macklin vs. the Home Telephone Company would also apply to it. Chapter 207 of the acts of 1894 of the State of Maryland and amendatory of Chapter 387 of an act passed in 1892, as I understand the Baltimore case, fixed the maximum rate for telephone service in the city of Baltimore at $6.50 per month. It seems, however, that the Maryland company subsequently in July, 1896, accepted an ordinance of the Mayor and city council of Baltimore, fixing the mode of use of the streets of said city and also attempting to fix the rates to be charged for service, which were not to exceed $4 per month for business telephones and $3 per month for residences. The act of the Legislature did not delegate to the municipal authorities of the city of Baltimore the right to fix telephone rates, but by direct act sought to do so. This being the case, the Findlay case would apply also in the controversy in which the Maryland Telephone and Telegraph Company is engaged.

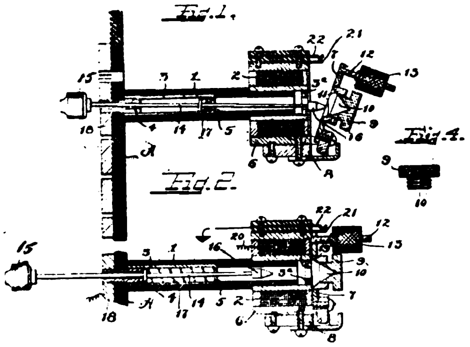
Patents

PROTECTOR.

Edward B. Ellicott, of Chicago, Ill., patents (No. 727,764) an electrical protective device. The invention, which is shown in Figs. 1 and 2, is intended to be used in connection with telephone, fire alarm and circuits of a like nature as a means of protection against strong foreign currents. Fig. 1 is a longitudinal section of the protector in its normal condition. Fig. 2 is a similar view after operation by an abnormal current.

The device consists of a tubular structure, 1, fastened to a suitable switchboard, *A*, and an electro-magnet, 2, which carries an armature, 7, the magnet being fastened to the end of the tube, as shown.

The tube 1 is made of insulating material, and carries within it a metallic sleeve, 3; the end of this sleeve is flanged, as shown at 5. Within the tube is a rod, 14, which extends through the hollow plug, 4, and has its forward end provided with a head, 15, and its rear end provided with a pointed shoe, 16, made so as to form a shoulder. The position of the rod, 14, is controlled by the action of a spring, 17, confined in the sleeve, 3, as shown. The arrangement is such that when the rod, 14, is pushed back into the tube the shoulder formed by the face of the shoe, 16, engages the metallic endpiece, 3*a*, of the tube and retains the rod in this position against the action of the springs. When the armature, 7, is swung towards its magnet, the inclined sides of the cavity, 10, lift the shoe, 16, disengaging it from the endpiece, 3*a*, and the rod, controlled by the spring 17 is thrown forward.



The line to be protected is connected to the metallic plate 18 on the board *A*, and the circuit is continued through the metal plug 4, sleeve 3, spring 17, rod 14, shoe 16, endpiece 3*a*, wire 19, to the magnet coil and out by wire 20.

It will thus be seen that when the armature 7 is drawn up under the influence of an abnormal current passing through the magnet that the rod 14 is released and the circuit broken.

The armature is provided with a weight, 13, on an arm, 12, the position of this weight determining the amount of current which must pass through the magnet in order to pull up the armature.

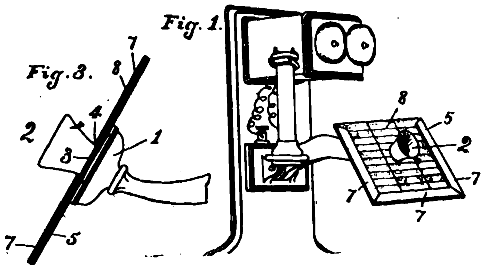
The magnet shell 6 is provided with contact strips 21 and 22, insulated one from the other and placed in such a manner that when the armature is attracted to the magnet the strips are brought into contact and the line grounded.

SPECIAL DIRECTORY.

Lewis M. Bannan, of San Francisco, Cal., patents (No. 727,880), a special telephone directory. The device, which is shown in the figure, consists of a metal plate with a circular aperture at the center.

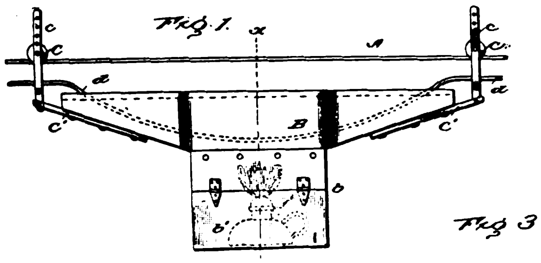
The mouthpiece of the transmitter carries a shoulder which covers the aperture in the plate and holds it firmly against the transmitter when the mouthpiece is screwed into place. The edges of the plate are turned up, as shown, and form guides to receive a sheet of cardboard which has an opening in the centre through which the mouthpiece passes. This paper is ruled in any desired manner and is intended to receive the numbers of the telephones most frequently called.

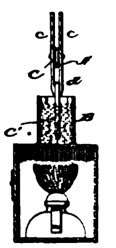
The device can also be used for advertising purposes by having the advertising matter suitably marked upon the upturned edges of the metal plate.



RE-INSULATING DEVICE.

John Daggett, of Elyria, Ohio, patents (No. 727,756), a device for re-insulating electric and aerial telephone or other cables. The invention, which is shown in Figs. 1 and 3, consists of a trough and attached to the under part thereof a receptacle for holding a lamp or other means of imparting heat to the substance in the trough. The invention has for its object the re-insulating of aerial cables and is adapted to slide along the messenger wire by means of the pulleys *C* which are fastened between the suspension pieces *c c*.





SWITCHBOARD LAMP.

Allen D. Whipple, of Chicago, Ill., patents (No. 728,060), a switchboard incandescent lamp, and assigns his invention to the Kellogg Switchboard & Supply Company. Fig. 1 shows a perspective view of the lamp, Fig. 4 a perspective view of one of the terminals, Fig. 6 a section through the lamp, and Fig. 7 a view of the lamp, as used in practice.

The bulb and filament are of the usual style. The contact strips 5 5 forming the terminals of the lamp extend along the sides of the bulb, for some distance, and are curved to closely fit the lamp. This curvature is continued at the ends, as shown at 6. The ends 7 of the terminals are made narrower than the main portion, are shaped in section and extend beyond the bulb, as shown, their extreme ends 8 being bent outward in order to secure a better hold on the cement of the cap. A terminal of the filament is soldered to each of the contact strips.

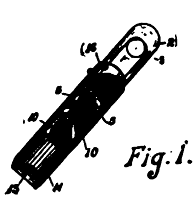


Fig. 1.

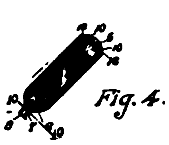


Fig. 4.

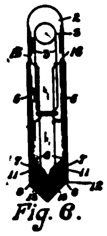


Fig. 6.

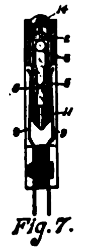


Fig. 7.

COMBINATION TELEPHONE AND FIRE ALARM.

William Denio, of Rochester, N. Y., patents (No. 728,161) a combined telephone and fire alarm system. The invention, which is shown in Fig 1, consists of an arrangement of circuits whereby the rise of temperature in the vicinity of a thermostat closes the telephone line circuit through an interrupter and flashes the line signal at the central office.

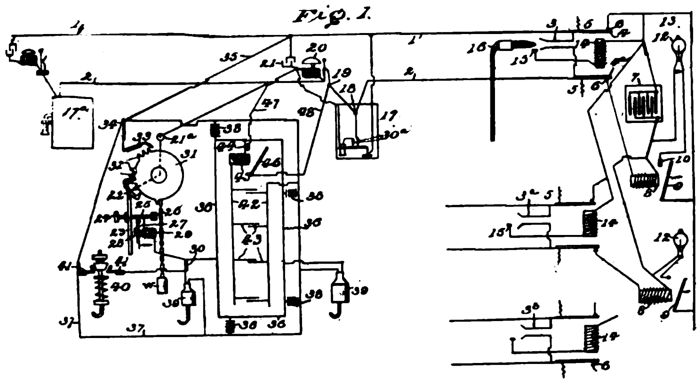
From the telephone terminal 18 a wire 19 is run through bell 20 and condenser 21 to the opposite side of the circuit, as is usual. A wire is run from the condenser, as shown, to the metal base, 21*a*, thence to escapement device 22, contact arm 23, screw 24, which is carried by arm 25, which is pivoted on insulating block

26, and is normally supported by the upper end of the locking armature 27; thence a wire is run from arm 25 to magnet 29 and switch 30, as shown.

From switch 30 a loop of wire 36 is run around the building or through the district to be protected. From switch 34 a second loop 37 is run parallel to the first loop, and thermostats connected between the two loops at the desired points.

When due to a rise of temperature in the vicinity of any thermostat the solder in it fuses, the loops are connected and the circuit is then closed as follows: Battery 7, wire 1, wire 35, loop 37, through the closed thermostat, loop 36, magnet 29, arm 25, to screw 24, escapement arm 23, to 21*a*, through bell 20, to wire 2, spring 4*a* and magnet 8, back to battery.

The current flowing through magnet 29 causes it to attract its armature, and allows arm 25 to drop out of the path of screw 24, thus breaking the fire alarm circuit and releasing the automatic transmitting wheel, which acting under the influence of the weight *W* makes and breaks the fire alarm connection, which now extends from wire 35 to spring 33, to wheel 31 (when a tooth touches the spring), to 21*a*, to bell 20, and back to the battery at the exchange.



It will thus be seen that the character of the flashes imported to the line signal are governed by the number and arrangement of the teeth on wheel 31. At the same time the action of the current flowing through the telephone bell vibrates the flashing light given by the line signal, thus enabling the operator to immediately distinguish the alarm.

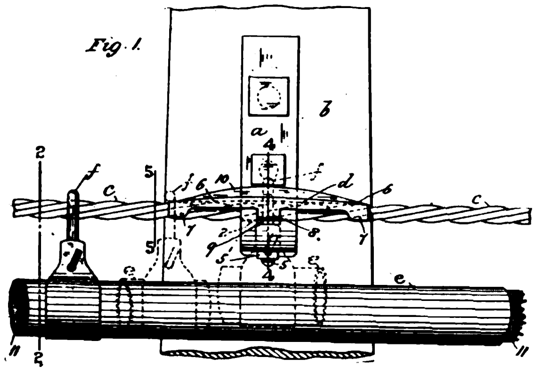
The system is also intended to include a burglar alarm circuit 42, and normally open circuit closers 43 suitably connected to the thermostat circuit, as shown at 44.

The relay magnet 45 has a permanently magnetic core of sufficient strength to hold armature 46 when attracted thereto, but not sufficient strength to attract the armature.

The operation of the burglar alarm short circuits the telephone bell through conductors 47 and 48 and at the same time operates the fire alarm which flashes the light at the central office, the flashes, however, being minus the vibratory characteristic.

WIRE HANGER.

Herman F. Neslage and Harry N. Watson, of St. Louis, Mo., patents (No. 728,278), a telephone wire hanger. The device, which is shown in the figure, consists of a bracket fastened to a pole, the bracket carrying the messenger wire used in supporting aerial cables. This bracket is so arranged that when the cable is pulled up taut, the hooks supporting it can slide along the messenger wire and also over the bracket, thus obviating the necessity of sending a man up each pole to raise the hooks over the bracket. This action is accomplished by forming the upper part of the cap *d* with a tapered rib 10 which extends from nothing at each end of the cap to its maximum height at the middle, thus presenting a continuous surface with the upper part of the messenger wire.



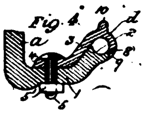
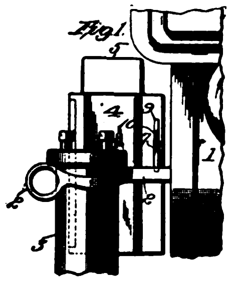


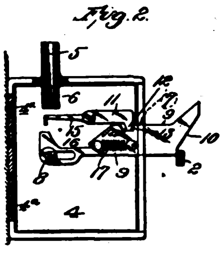
Fig. 1 shows a front elevation of the hanger and Fig. 4 a cross section on line 4 4 showing the method of clamping the messenger wire.

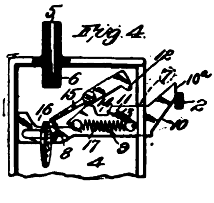
PAY STATION.

Edward G. Lewis, of St. Louis, Mo., patents (No. 728,478), a telephone lock. The invention consists of a coin collecting box, which is fastened to or near the telephone and which by means of a locking bar, restrains the hook switch from rising and closing the circuit until a coin has been deposited in the box. Fig. 1 shows a front elevation of the device, and Fig. 2 a vertical section through the box. Pivoted to the side of the box is a locking bar 9, provided with a spring 17, which tends to pull it towards the exterior of the box. The outer end of the bar is shaped as shown in Fig. 2.

Pivoted above this bar is a locking lever 11, provided with a nose 12, adapted to engage the shoulder 13 on the bar 9, thus holding it in its extended position and locking the hook switch 2, as shown.







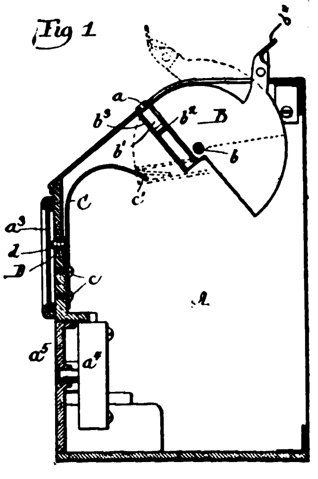
The insertion of a coin in slot 5, and the consequent weight of the coin on arm 15 of the lever, raises the nose 12 out of engagement with the shoulder on the locking bar and the receiver being removed from the hook, the pressure of the hook switch spring forces the bar into the box and allows the hook switch to rise and close the circuit. The locking bar is held in its backward position by the pressure of the hook switch 2 against the surface 10*a* of the locking bar, and the end 15 of the lever is allowed to fall into the depression 16 and the coin to drop into the box.

PAY STATION.

Edward P. Baird, of Evanston, Ill., patents (No. 728,833) a signal device for telephone systems and assigns to the Baird Manufacturing Company. This invention has for its object the production of distinctive audible signals in telephone coin collectors. Fig. 1 shows a section through a collecting box equipped with this device.

The device is provided with a coin carrier, *B*, having a slot b^4, wherein a coin of the proper size will be held by a stop b^2. The carrier is recessed at b^3 in order that a portion of the coin may engage the signal device. It is also provided with a lever, b^4, for manual operation.

The signal device consists of a sound producing strip *C* fastened to the case at *c*; its end, c^1 is bent and projected into the path of travel of the coin. An abutment, *D*, is screwed in the case, so that the vibration of the strip *C* will repeatedly tap it, after the strip has been vibrated by coming in contact with a coin. It is claimed that by thus damping the vibrations of such a strip distinctive sounds may be produced and that sounds of different pitch may be had, according to the location and adjustment of the abutment *D*.



The Week's Messages.

FINANCIAL.

CHICAGO, ILL.—The directors of the Strowger Automatic Telephone Company have declared a dividend of 50 cents a share on the $5,000,000 capital stock, payable July 1, to holders of record June 15. Books close June 15 and reopen July 2. This is the first dividend since October, 1899, when $1.50 a share was paid. While no statement was made as to whether the present dividend was the resumption of regular payments on the stock, it is reported to be the intention of the directors to make semi-annual payments steadily from now on.

CONNERSVILLE, IND.—The board of directors of the Connersville Telephone Company have passed a resolution authorizing the increase of capital stock of the company from $50,000 to $100,000. T. A. Frazee, secretary.

FT. WAYNE, IND.—The Home Telephone Company will issue $50,000 more of stock and bonds on July 1 to cover improvements made necessary by the growth of the business. The contract has been let to Fred Rump for the construction of the new exchange, which will cost $6,000.

FT. WAYNE, IND.—The capitalists of Logansport who own a half interest in the Home Telephone of that city have offered the Electrical Investment Company, of this city, which owns the other half, a premium of 25 per cent. in 5 per cent. bonds for its interest in the plant. The amount of stock, face value, held by each is $86,000, so that the Ft. Wayne capitalists will receive bonds to the amount of $107,500 for their investment. The Electrical Investment Company will devote the proceeds to the improvement of its plant at South Bend, where it owns practically all of the plant, and, though in operation only since January 1, has earned at the rate of 6 per cent. on the bonds and 8 per cent. on the stock.

FRENCH LICK, IND.—The Star Telephone Company of French Lick, of which W. F. Moore is president and Miles Rolan secretary, has increased its capital stock from $2,000 to $15,000.

CRESTON, IOWA.—The stockholders of the Creston Mutual Telephone Company have decided to increase the stock from $80,000 to $100,000. They also voted to expend $12,000 in improvements and additions to the lines within the city limits.

SERGEANTSVILLE, N. J.—The Merchants' and Farmers' Telephone and Telegraph Company of Sergeantsville, Hunterdon county, has increased its capital stock from $10,000 to $20,000.

FRANCHISES.

ROSEAU, MINN.—The village council has granted a franchise to C. A. Pearson to put in a local telephone system.

INDEPENDENCE, MO.—The Retail Merchants' Association favors granting a franchise to the Twentieth Century Telephone Company.

GREENWICH, N. Y.—The Saratoga Telephone Company has received permission from the trustees to set poles and wires and install instruments in this place.

MADISONVILLE, O.—A Mr. Fee, representing the Citizens' Telephone Company, and who says his company operates in Milford and Loveland, has asked for a franchise here.

EDDYSTONE, PA.—The question of granting privilege to the United Telephone Company to lay underground conduits for its wires through the borough came up at the meeting of Eddystone council and passed second reading.

BALLARD, WASH.—At a meeting of the city council the Independent Telephone Company, of Seattle, asked for a fifty-year franchise to install a telephone system in this city. The ordinance granting the franchise was placed on its first reading and referred to the city attorney. Residence telephones will not cost more than $2.50 per month and business telephones not more than $4 per month.

MARINETTE, WIS.—The American Electric Telephone Company, of Chicago, has applied through its representative, H. C. Dodge, for a franchise to construct and operate a telephone exchange here, and a similar application is being made in the sister city, Menominee, Mich., which is located directly across the Menominee River. The terms of the application call for a full multiple central energy system and intercommunication without extra charge between the two cities.

CHARLESTOWN, W. VA.—C. C. Gaver, of Hillsboro, Va., has been granted a franchise for the Old Dominion Telephone Company to erect lines to Harper's Ferry. The company, it is stated, will connect with the United Telephone and Telegraph Company's lines.

ELECTIONS.

WEBER, MO.—The stockholders of the Highland Telephone Company of Lewis County held their annual meeting here recently and elected the following officers and directors: J. D. Loudermilk, Weber, president; E. F. Westhoff, La Grange, secretary and treasurer; J. D. Loudermilk, John H. Blackburn, James Willows, all of Weber, directors. The financial report of the company was very satisfactory.

BUFFALO, N. Y.—At a meeting of the directors of the Frontier Telephone Company the resignation of Vice-President William A. Douglas was read and accepted. He will continue as a director of the company. Henry H. Persons was elected to fill the vacancy. S. A. Wayland, of Scranton, Pa., general manager of the company, also resigned. He was elected second vice-president.

ST. ALBANS, VT.—The directors elected by the Franklin County Telephone Company are: M. P. Abbott, J. H. Abbott, H. G. Morton, E. C. Smith, A. C. S. Beeman, F. W. Story, M. B. Jones, Jasper N. Keller, Francis A. Houston, William J. Denver, Carl T. Keller, the last six named being residents of Boston. The board of directors organized by the election of the following officers: President, Jasper N. Keller; vice-president, J. H. Abbott; secretary, S. W. Flinn; treasurer and general manager, M. P. Abbott; auditor, V. P. Abbott.

COMBINATIONS.

CHICKASHA, I. T.—The Independent local and long distance telephone companies of Chickasha have been purchased by the Topeka and El Reno Telephone Company, the consideration being $15,000. This gives the purchasers control of all the Southwestern Oklahoma and Indian Territory lines, their only competitor being the Bell people, who are excluded from most of the towns by franchise. The Chickasha system is the last to be absorbed. Many improvements in service and equipment will be made.

CLARENCE, MO.—J. W. Reasor has sold the Clarence telephone exchange to W. W. Tracy, of Hale City, Mo., for $5,000.

MT. GROVE, MO.—The Wright County Telephone Company has sold its exchange in this city to Adam Snowden.

GUTHRIE, O. T.—The Oklahoma Southwestern Telephone Company, which comprises almost 200 miles of wire and a number of exchanges, has been sold to the Consolidated Telephone Company, of which Attorney Blake, of El Reno, is at the head. The headquarters of the company will be moved from this city to Washita. Vernon V. Harris, secretary, will remain with the Consolidated for a while. The price paid for the Oklahoma Southwestern Telephone Company lines was $20,000.

CLARKSVILLE, TENN.—The Houston County Telephone Company, with headquarters at Erin, Tenn., and the Clarksville Home Telephone Company, with headquarters at Clarksville, Tenn., have consolidated, or rather the Houston Company has been absorbed by the Clarksville. The former receives stock in the latter to the amount of $4,300 in exchange for all its property and franchises. The Clarksville Company is now building its lines southwesterly through Tennessee, intending to reach Memphis, and is also extending to Louisville, Ky., and Nashville, Tenn., and has completed arrangements with the Toledo, O., Company, by which it will reach a number of cities and towns in Kentucky, Indiana, Ohio and Illinois. The Clarksville Company is a competitor of the American Bell—or rather the Cumberland, which is a part of the Bell system—and is the property of capitalists in the city from which it takes its name.

THE WEEK'S MESSAGES—Continued.

MISCELLANEOUS.

JEFFERSON, IA.—A meeting of stockholders of the Greene County Farmers' Mutual Telephone Company has been called in this city on June 27, for the purpose of voting upon the question of incorporating the company under the laws of Iowa.

DODGE CITY, KAN.—Dr. J. M. Sharp, proprietor of the Dodge City Telephone Exchange, is in the city making arrangements to put in new telephones. A line will be run to the State Soldiers' Home.

WILLIAMSTON, MICH.—The telephone exchange at this place is now completed, F. M. Monroe, manager.

NASHVILLE, TENN.—In the Chancery Court recently the Frankfort American Insurance Company filed a cross-bill against the Cumberland Telephone & Telegraph Company. The matter in controversy is the premium on a policy to indemnify the Telephone Company against losses by accidents. The cross-complaint charges that instead of it being indebted to the Telephone Company, that the latter is indebted to it in the sum of $25,000. The policy was based on the payroll of the company, not including the executive officers. This, it is claimed, was represented by the president to be $47,000, and the insurance was on the basis of a $50,000 pay roll. The indemnity was cumulative, and might extend into hundreds of thousands of dollars. The cross-complainant charges, upon information which it believes to be true, that the pay-roll of the year next after the issuance of the policy was not less than $400,000 and that the president knew that to be true when he stated that it was as near as he could state, $47,000. In February, 1900, the policy was renewed on a basis of $80,000, but the latter policy was cancelled. Cross-complainant charges that the Telephone Company is indebted to it in the sum of over $25,000 of additional premium. An accounting is asked, and a decree for the amount found to be due cross-complaintant is prayed.

UNDERGROUND.

COLUMBUS, GA.—An effort is being made to compel telephone and electric companies to put their wires underground.

MARSHALLTOWN, IA.—The Marshalltown Telephone Company will lay four or five miles of conduits for its cables.

PITTSFIELD, MASS.—The board of aldermen have granted a permit to the New England Telephone and Telegraph Company to lay conduits and place its wires underground in certain streets. The petition of the new Berkshire Telephone Company for conduit location through certain streets was referred.

New Construction in the Field

ATLANTA, GA.—The new switchboard of the Atlanta Telephone and Telegraph Company, the corporation succeeding the Standard, has arrived and is now being installed. Within a week 1,200 of the new telephones will be received, and President Simmons announces that the new service will be in active operation by June 15. The long distance plans of the company are not yet matured, but are moving satisfactorily, it is said.

NEW ALBANY, IND.—The Home Telephone Company is extending its lines to Elizabeth, Mauckport, New Amsterdam, New Middleton and Leavenworth.

HUMBOLDT, IA.—The Humboldt Rural Union Telephone Company will soon have its line in running order. The line will run in every direction from Pioneer.

COLONY, KAN.—The Colony Telephone Company has about completed the building for the Central office. Nearly all of the material, including the telephones, has been received and is ready for use. Construction work will be commenced immediately on arrival of the poles, which have been delayed. A part of the plan is the establishment of country lines radiating from town, which will be proceeded with as soon as the local exchange has been built and is in running order.

SEBAGO, ME.—The Baldwin and Sebago Telephone Company is extending its line along the mountain road.

McPHERSON, KAN.—The poles for the new telephone line started by Joshua Lawrence in Turkey Creek township are partly put up. S. W. Kasey, of route five, and others, are talking up another line to run west and north of town. The principal farmers pushing this line are: S. W. Kasey, William Blackman, Geo. Shuerer, B. Tyndal, A. F. Carlson, J. K. Schlatter, W. T. Cheney and the Walker Brothers.

HEBRON, ME.—The Hebron Telephone Company is extending the line over Merrill Hill.

MACHIAS, ME.—The Washington Telephone Company is arranging to construct a line from Machias to Wesley and another from Machias to Roque Bluffs.

OAKLAND, MD.—The Garrett County Telephone Company has contracted for 35 miles of new line from Bittinger to New Germany, Avilton, Frostburg and Lonaconing, with a number of short lines building out from the main line. A heavy reduction in rates was made to take effect after July 1 as follows: Residence rate, $2 per year; business rate, $4, a reduction of over fifty per cent., from former rates, new subscribers to get free service until July 1 next.

GRAND RAPIDS, MICH.—Satisfactory progress is being made in the new building for the Citizens' Telephone Company. The company has drawn two 400 pair cables into the conduits.

ST. JOHNS, MICH.—The Union Telephone Company is now connected with Eagle. It is also giving first class long distance service to Petoskey and Toledo, Ohio, where it is connected with upwards of 7,000 subscribers.

AUSTIN, MINN.—The Interstate Telegraph and Telephone Company of Austin has let the entire contract for putting in its local system to James B. Taylor of La Crosse for $40,000.

CANTON, MO.—The Lewis County Telephone Company will soon construct a new line from this place to La Grange, to be used exclusively for commercial work.

INDEPENDENCE, MO.—The Home Telephone Company has purchased a new switchboard equipped for 2,000 lines.

MEREDITH, N. H.—The Meredith Telephone Company is contemplating making numerous extensions to its system, among them being the laying of a cable to connect Bear Island. The company has decided to offer to the people of Meredith and vicinity a portion of its stock at par, $25 per share, the money to be used in building extensions and getting new business.

EAST AURORA, N. Y.—The Haines Telephone Company is constructing a line which will connect this village with Hamburg, Armor and Orchard Park.

LOWVILLE, N. Y.—The Black River Telephone Company has completed connections with the Home Telephone Company of Utica, through which Albany, Schenectady and other eastern points may be reached. The Black River Company has arranged to connect with the Fulton Chain Telephone Company. It has secured contracts for 49 telephones at Pulaski.

NIAGARA FALLS, N. Y.—The Niagara County Home Telephone Company will construct two new toll lines between Tonawanda and Niagara Falls, and Tonawanda and Lockport.

RICHFIELD SPRINGS, N. Y.—The Richfield-South Columbia Mutual Telephone line is nearing completion.

SENECA FALLS, N. Y.—The Home Telephone Company has secured practically all the rights of way between this village and Ovid, and the work of extending the line to that village will be pushed as rapidly as possible.

BARNESVILLE, O.—The Belmont Telephone Company is putting in new cables and new subscribers will soon be connected. The business of the company is constantly increasing.

ALTOONA, PA.—The United Telephone and Telegraph Company is constructing a line from Bellewood to connect with Lloydsville, Mountaindale, Blandsburg, Glasgow and other places. An exchange will be established at Bellewood and connections made with Clearfield.

MESHOPPEN, PA.—The Tunkhannock and Wyoming Valley Telephone Company has received the copper wire for its new line from Tunkhannock to Laceyville via Meshoppen.

NICKLEVILLE, PA.—W. E. Widel, Jr., manager of the Valley Telephone Company, has begun the construction of a new line between Mariasville and Nickleville.

TAMAQUA, PA.—The Carbon County Telephone Company will build a trunk line between Tamaqua and Mauch Chunk, connecting with the United lines here and the Consolidated lines at Mauch Chunk.

DELL RAPIDS, S. D.—The Dell Rapids Farmers' and Merchants' Telephone Company will soon commence the construction of its lines, and it is expected to commence with between 50 and 75 subscribers. Among the directors of the company are M. R. Kemfeck, L. K. Larson, O. O. Lawyer and Henry Robertson, the latter of whom is now canvassing for subscribers.

THE WEEK'S MESSAGES—Concluded.

HUMBOLDT, TENN.—It is reported that the Home Telephone Company, now operating at Memphis and Jackson, will build a line from Jackson to Humboldt.

DENISON, TEX.—W. H. Lawrence, the proprietor of the Quick Service Telephone line, is building a telephone line from Roberta to Allison.

DENTON, TEX.—The Independent Telephone Company, to whom the city of Denton granted a franchise about two months ago, is installing a system.

GREENVILLE, TEX.—Mr. Glendon is here from Illinois to superintend improvements on the Home Telephone exchange and lines. The work of excavating for underground wires is in progress.

LYONS, TEX.—The Weiss Texas Telephone Company will build a line to Birch from Lyons.

SAN ANGELO, TEXAS.—The San Angelo Telephone Company has ordered a 700-drop switchboard, which will be used in place of the present board, which accommodates 400 telephones.

PLAINFIELD, VT.—The People's Telephone line is being extended to connect with the Barre line at East Plainfield. Another line is to be extended from Plainfield to East Calais.

WAUSAUKEE, WIS.—The Wausaukee Telephone Company's lines are to be extended to Amboy, Dunbar and Pembine, giving connection with Marinette County subscribers and many towns in the upper peninsula of Michigan.

TRADE NOTES

The Vought-Berger Company, makers of telephones and switchboards, La Crosse, Wisconsin, have installed a great deal of new machinery in their plant recently. The capacity of the machine shop has been almost doubled, and the wood-working plant has been largely added to. The factory is also being equipped throughout with the fan and blower system of the American Blower Company. The stock room has been moved into a fire proof stone building in the center of the company's property, as have also all of the company's dies. These improvements have been necessitated by a heavy increase in the company's business.

The Century Telephone Construction Company, of Buffalo, N. Y., will soon open the Le Roy Telephone Company's exchange at Le Roy, N. Y. This exchange was built complete and all apparatus furnished by the Century Company. The present equipment consists of 200-line full common battery electric light line signal board and double supervisory lamp signals. The power plant consists of 200-line full common battery electric light line signal dynamos, switchboards and customary apparatus. This plant is one of the most complete and up-to-date telephone plants in the country.

The Century Company has just completed the plant for the Avon Telephone Company, Avon, N. Y. The outside construction is everything that can be desired, and the central office equipment consists of a visual target signal common battery switchboard with double supervisory visual target signals, one of the Century Company's latest productions. The power plant consists of the usual storage batteries, motor dynamos, switchboards, etc. This plant is one of the models of western New York State. The company is also building an exchange at Charlotte, N. Y., and installing a magneto system there. In its manufacturing department it is kept very busy. A new catalogue announcement is being prepared which will be ready in a short time.

The Leeds & Northrup Company succeeded on June 1st to the business of M. E. Leeds & Company. The change is a growth and expansion, rather than a transfer of that business. Mr. M. E. Leeds, who has been the managing member of the firm of Leeds & Co., is the president of the new company, and will devote himself particularly to the selling.

Dr. Edwin F. Northrup is the secretary, and will have charge particularly of the manufacturing. His training and talents fit him in a very unusual degree for this position in an establishment manufacturing scientific instruments.

The new company starts under favorable conditions. The business of Leeds & Company has enjoyed a steady growth during its existence, and in the year just passed increased its business 33 1-3 per cent. over the previous year. There have been developed a number of new and important instruments, and at the same time the regular line has been thoroughly revised where it has been found necessary. The company has availed itself of the opportunities offered by the National Bureau of Standards to keep its reference standards carefully checked, and has made extensive additions to its equipment of tools and secondary standards.

A complete catalogue of the apparatus manufactured by the Leeds & Northrup Company has just been issued. In addition they are publishing the following special pamphlets: No. 1, Resistance Boxes & Wheatstone Bridges; No. 2, Potentiometers; No. 3, Moving Coil Galvanometers; No. 4, Standard Resistances; No. 5, Portable Testing Sets & Cable Testing Apparatus; No. 6, X-Ray Apparatus; No. 7, High Grade Keys for Electrical Testing; No. 8, Self-Induction Apparatus; No. 9, Carey Foster Bridge; No. 10, Hoopes' Conductivity Bridge.

These pamphlets are not confined exclusively to descriptions of instruments which they cover, but they treat the subject in a broad way, going into the general question of the best designs and in many cases including detailed instructions for using the instruments.

In the belief that the requirements of their customers can best be met by dealing with them directly, the Leeds & Northrup Company have discontinued the exclusive selling agency arrangements of M. E. Leeds & Co. Detailed information in regard to points of design, conditions of use and performance of instruments is frequently of great importance to buyers, and this information can only be given by those who are intimately associated with the manufacture. The Leeds & Northrup Company consequently particularly request that all correspondence in regard to apparatus of their manufacture be addressed to them directly.

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

FIFTEEN Wilhelm telephones, in good condition, for sale cheap. Write E. J. Wilcoxen, East Main Street Station, Rochester, N. Y.

INDIANA telephone plant for sale; has 150 subscribers; good opening for young man with some knowledge of the business. Address The Telephone Engineering Co., 337 Lemcke Block, Indianapolis, Ind.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

POSITION as manager or superintendent of exchange, 200 to 300 lines; five years' experience on board, toll lines and construction work, grounded or metallic; aged 38; married, sober, industrious and reliable. Address A. W. Cripps, Harrison, Ark.

COMPETENT telephone man desires position; eight years' experience in construction work, repairing instruments and general trouble work; best of reference as to ability and character. Address John H. Ward, Little Falls, Minn.

DRAFTSMAN familiar with telephone cable distribution, handling men, making out estimates, etc. State experience and salary expected. Address BOX 56, care The American Telephone Journal, New York.

SUCCESSFUL manager will be open for position about August 1st. Familiar with up-to-date system and methods. South or West preferred. Satisfactory references. Address BOX 54, care The American Telephone Journal, New York.

POSITION AS TROUBLEMAN; have had seven years' experience as local and long distance telephone troubleman, and also fire alarm troubleman; Minnesota or Dakota preferred. Address BOX 50, care The American Telephone Journal, New York.

WIRE CHIEF wanted immediately for central-energy plant; none but first-class men need apply. Address Jackson Home Telephone Company, Jackson, Tenn.

ELECTRICAL MEASUREMENTS—ARTICLE XIII

MEASUREMENTS OF RESISTANCE WITH A CONDENSER

By Arthur Vaughan Abbott.

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THE condenser forms a valuable adjunct to the outfit of the testing engineer and as the telephonist usually has plenty of condensers at his command, the various methods of measurement that employ condensers are to him of particular utility and value. Among these the method of measuring high resistances is particularly worthy of attention. It has been shown that if a condenser is charged it apparently holds a quantity of electricity, and if we imagine the condenser to be perfectly insulated, this electricity will remain thus confined for an indefinite length of time. The condenser therefore forms, so to speak, a kind of a tank in which electricity can be carted about and be poured out of at pleasure. Now if a condenser of a known capacity be charged and then be allowed to discharge through a known resistance for such a period of time as will not completely exhaust its charge, and then, if the residual charge remaining in the condenser be measured, it is evidently possible to calculate from the charge lost by the condenser the resistance of the conductor through which the discharge took place. It has been explained that the unit of capacity is the farad. This capacity is such an one as would be charged to a potential of 1 volt by a circuit carrying 1 ampere provided the circuit were attached to the condenser for one second. A circuit would carry 1 ampere that had a difference of potential at its terminals of 1 volt and a resistance of 1 ohm; evidently in such a circuit a certain quantity of electricity will pass in a unit of time, now the quantity of electricity which traverses such a circuit in one second is called a coloumb and therefore a condenser having a capacity of 1 farad will hold 1 coloumb. Let us suppose, to illustrate this method of measuring resistance that such a charged condenser be connected to an unknown resistance and allowed to discharge for one second, and subsequently the electricity remaining in the condenser is measured and found to be half a coloumb. By definition a circuit having an electromotive force of 1 volt and a resistance of 1 ohm would charge 1 coloumb into the condenser in one second, and if the condenser loses half of its charge in one second, evidently half the electricity flows out, and therefore the resistance must be twice as great as was the case with the circuit which charged the condenser. The practical method of measuring high resistances by the use of the condenser is as follows:

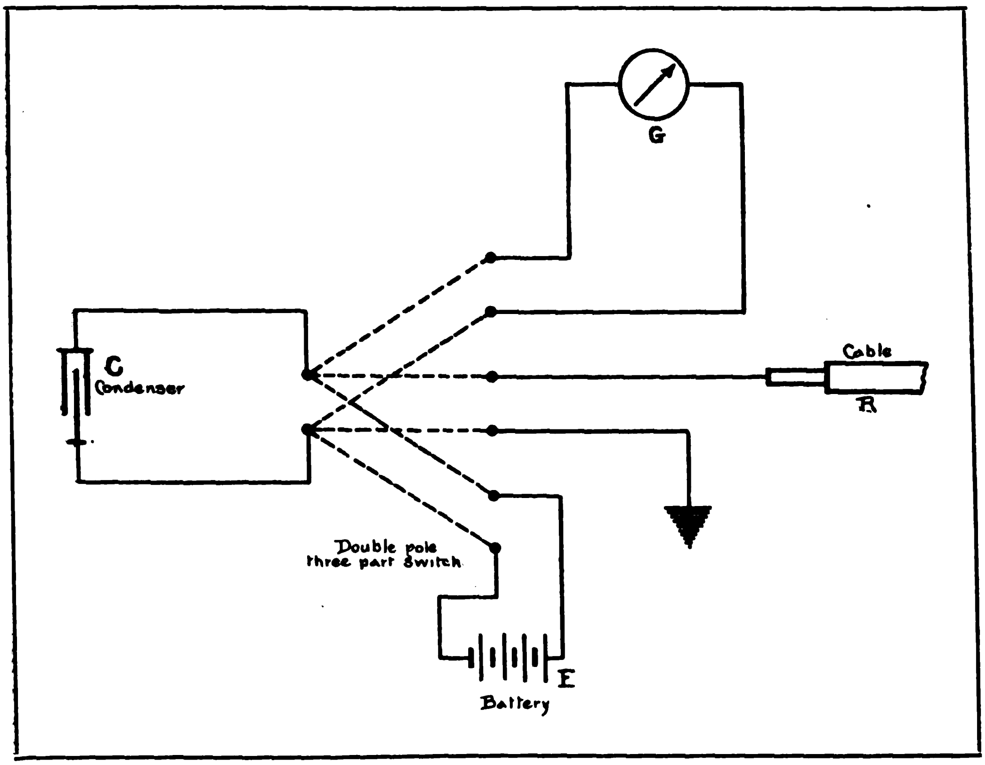

Fig. 1.

A condenser of known capacity having anywhere from ¼ to 2 micro-farads is charged by connecting it with a battery or other source of electricity. The terminals of the condenser are then connected quickly to the resistance to be measured and allowed to remain in contact therewith for a definite number of seconds. When this time has elapsed the condenser is connected to a galvanometer and the charge remaining in it measured by the deflection of the needle. From the previous example it is easy to calculate the unknown resistance from the charge remaining in the condenser. The diagram, Fig. 1, shows the connections for this purpose. *E* is the battery of any convenient electromotive force, preferably about 100 volts. Whenever an Edison lighting circuit is convenient it forms an admirable source for charging the condenser. *G* is the galvanometer, *C* the condenser, *R* the cable or other unknown resistance to be measured. By means of the key *K* the battery is connected with the condenser for a few seconds. By throwing the key one pole of the condenser is then connected to the cable and the other to the earth (if any other high resistance is to be measured one terminal of the condenser is connected to one end of the resistance to the other terminal to the other end). The condenser is then allowed to discharge for a desirable length of time, and when this time has elapsed a second throw of the key connects the condenser to the galvanometer and the deflection of the needle is observed. Prior to making any test the deflection produced on the galvanometer by the full charge of the condenser should be known or measured. We then have the necessary information from which we can calculate the amount that the condenser has discharged through the unknown resistance in the measured time and it can be shown that under these circumstances the resistance is given by the formula:

$$R = \frac{.4343\, t}{C \log \frac{d}{d'}}$$

In this expression *R* is the unknown resistance, *t* is the time in seconds that the condenser is connected with the unknown resistance, *C* is the capacity of the condenser in micro-farads, and $\log \frac{d}{d'}$ is the common logarithm of the quotient of the deflection *d* produced by discharging the fully charged condenser through the galvanometer, divided by the deflection *d'* obtained after the condenser has been discharged for *t* seconds through the unknown resistance. In practical testing any fairly good condenser is adequate for the purpose, those as manufactured for subscribers' sub-stations are admirable if carefully made and well insulated. Any one of the galvanometers previously described may be used to measure the discharge of the condenser and even a more portable instrument can be obtained by using a high wound voltmeter. A good rubber mounted double pole

GRAPHICAL TABLE TO DETERMINE RESISTANCE BY LOSS OF CHARGE

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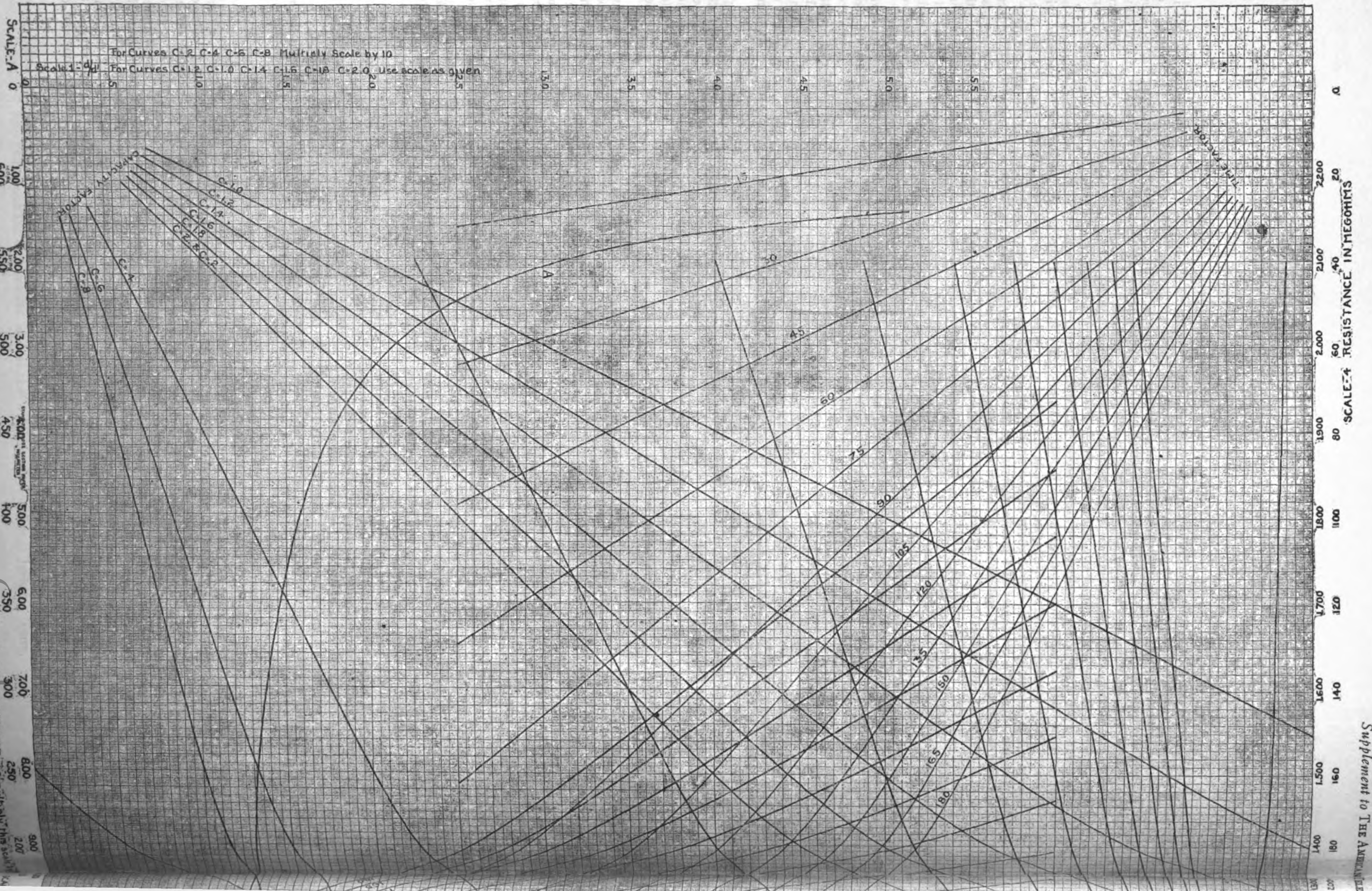
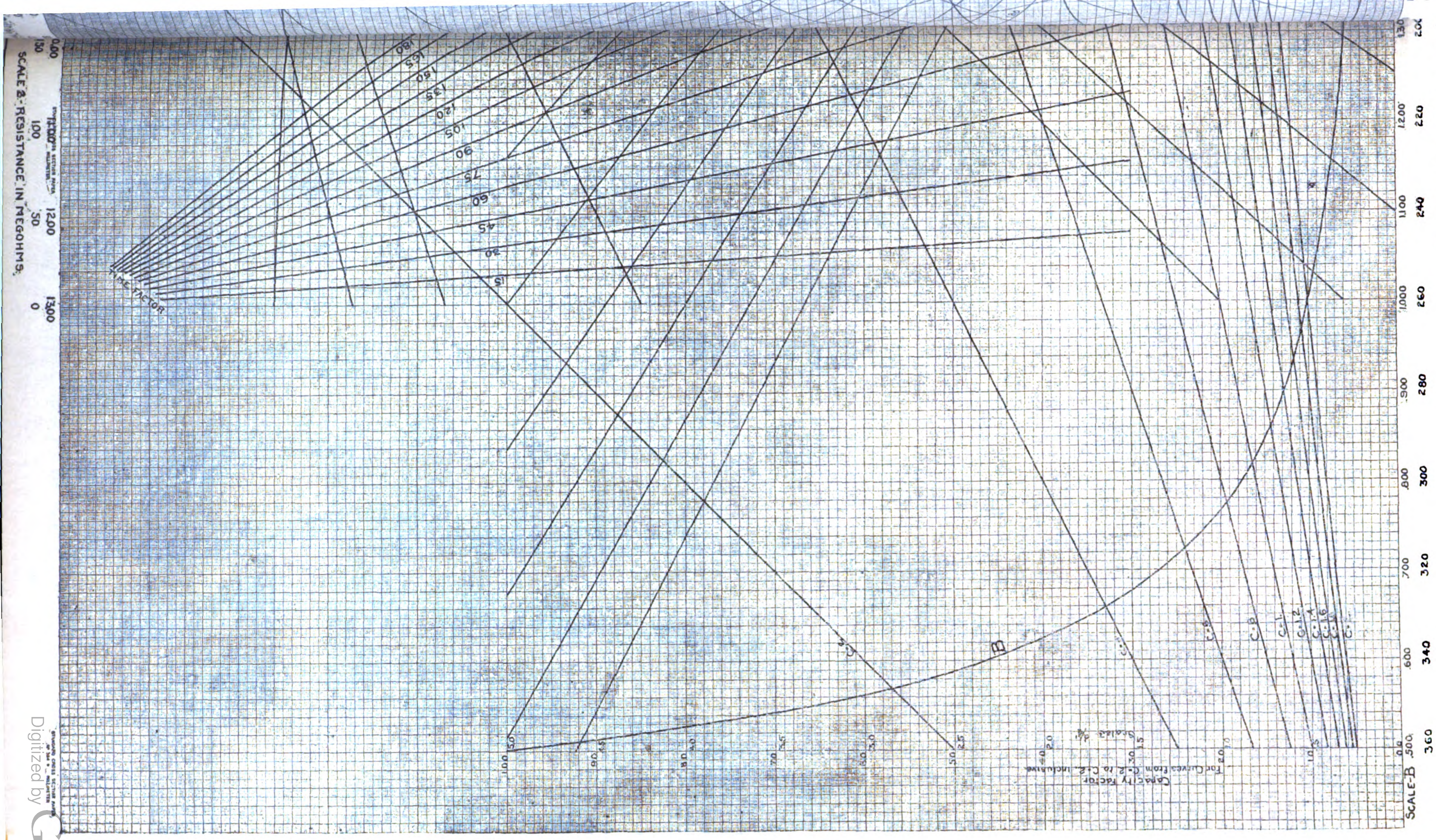




DIRECTIONS FOR USING TABLE:

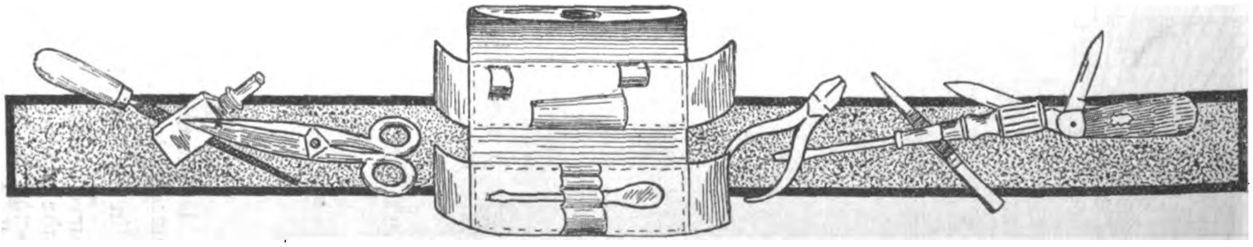
Divide the deflection *d*, given by the galvanometer with the condenser fully charged, by the deflection d^1, given by the galvanometer after the same condenser has been connected to the cable for *t* seconds. If this quotient is less than 5, use the sheet with the scale *A*, in the left-hand corner. If greater than 5, use the sheet with the scale *B*, in the lower left-hand corner. On the left-hand vertical scale select the number corresponding to the quotient $\frac{d}{d^1}$, and from this number follow a horizontal line to the curve marked *A*. Then follow a vertical line until this vertical intersects such a line radiating from the corner labelled "capacity factor" as bears the number representing the capacity of the condenser employed; thence follow a horizontal line to the right until this horizontal line intersects such a line radiating from the corner marked "time factor" as bears the length of time *t* with the condenser there allowed to remain in contact with the unknown resistance. Thence follow a vertical to the lower scale reading "unknown resistance in megohms." The method of using the table with the scale *B* in the left-hand corner is exactly the same.

pp 389-90 apparently not published

switch forms an excellent key, so that the whole apparatus, condenser, voltmeter and key may be placed in a box 8 inches wide, three inches deep and a foot long. A flexible cord with a screw plug for attaching to a lamp socket, if Edison current is available, or a portable chloride of silver battery of seventy-five cells, completes the outfit. Theoretically if the insulation of the condenser is not perfect it will itself lose some charge during the time it is connected with the resistance to be measured and for extreme accuracy the results must be corrected for this loss. This is very easily done by deciding before making the test for how long a time the condenser shall be connected with the cable, and measuring the deflection d after the condenser has been charged and insulated for this selected time, and thus eliminating all question of loss of charge from the condenser. Under these circumstances the deflection given by the condenser with the leakage deducted is obtained, and may be compared directly with that observed in measuring the unknown resistance.

The preceding formula is not difficult to solve, but a graphical table may be made whereby all calculation can be saved, and as soon as the deflections are read from the galvanometer the resistance in megohms is immediately obtained. Such a table is shown in Fig. 2.

By inspection it is easy to see that the formula $R = \frac{.4343\,t}{C \log d/d'}$ may be written as follows: $R = .4343\,t \times \frac{1}{C} \times \frac{1}{\log d/d'}$, and by this analysis the formula has been separated into three factors. It is now possible to assign reasonable values to $.4343\,t$, $\frac{1}{C}$ and $\frac{1}{\log d/d'}$, and then to plot the results of the three factors as a set of curves upon a sheet of cross section paper and by these curves one can solve the preceding formula for very wide ranges. In the diagram given in Fig. 2 the values of d/d' are assumed to vary between .1 and 100. The value of C is shown for from .2 microfarads to 2 micro-farads, and by inspection it is easy to read to a single tenth of a micro-farad, and finally the values of t are taken from 15 seconds to 180 seconds. Turning to the diagram, the curve marked A is the curve for $\frac{1}{\log d/d'}$. The values of d/d' are shown upon the left-hand side by the scale headed No. 1—d/d'. It will be seen that the curve A covers the portion of this scale from 1.2 to 5.0. Radiating from the lower left-hand corner are a series of 9 lines, which are marked *"Capacity Factor."* These lines give the values of the factor $\frac{1}{C}$. Lastly, from the lower right-hand corner of the sheet is a series of twelve lines, marked *"Time Factor,"* from which the value of $.4343\,t$ can be obtained. The use of the table can be best understood by an example. Let us assume that the engineer is called upon to measure the resistance of a telephone cable, and that he has supplied himself with a condenser having a capacity of .6 micro-farads, and that after this condenser is charged and allowed to stand insulated for one minute its discharge produces a deflection in the galvanometer of 300 divisions. Suppose then that the condenser is charged, one terminal connected with the cable and the other terminal put to ground and allowed to remain thus for the same period of time, namely, one minute, and then discharged through the galvanometer, and that under these circumstances the deflection produced is 150 divisions. It is easy to see that under these circumstances d/d' is 2, that is to say, $\frac{300}{150}$ gives a quotient of 2. Select 2 upon the left-hand side of the sheet on scale No. 1, follow a horizontal line across the sheet to the right-hand until the curve A is reached. If then a vertical line be followed to the lower horizontal scale, marked "scale A," a reading of 3.3 is found. This is the value of $\frac{1}{\log d/d'}$, but in order to solve formula we must multiply $\frac{1}{\log d/d'}$ by $\frac{1}{C}$, and we must multiply this product by $.4343\,t$. Consequently instead of following a vertical line from the curve downwards to the scale A, we follow a vertical line downwards to the curve headed $C = .6$, that is to say, $C = .6$ of a micro-farad, which is the size of the condenser assumed to be used in the testing apparatus. This is equivalent to multiplying $\frac{1}{\log d/d'}$ by $\frac{1}{C}$. If now we follow a horizontal line across the sheet to the set of curves marked *"Time Factor"* until we intersect the one marked "60" we multiply by $.4343\,t$. To get this product follow a vertical line downwards to the scale marked "3, *Resistance in megohms,*" and find R (the desired resistance) is 14 megohms. Consider a second example: Suppose d is 360 and d' 120; also assume that a condenser of 1.4 micro-farads be used in the testing set, and that the time of discharge be 135 seconds, d divided by d' equals 3. Take the point 3 on scale 1, follow a horizontal to curve A, thence a vertical to the capacity factor curves, selecting the one marked 1.4, thence follow horizontal line to right hand of sheet to time factor lines, selecting the one marked 135, and thence a vertical to the lower scale marked resistance in megohms, finding 98 megohms. If the sheet be turned around so that the curve B and scale B appear in the lower left-hand corner a second series of values are obtained, extending the diagram over a range of from fraction of a megohm to about 6,000 megohms. On this side of the sheet scale 3, the vertical scale is again devoted to d/d' and reads from 1.5 to 100. The capacity factor curves and the time factor curves are shown on the corresponding right and left-hand corners. The use of this diagram is the same as shown by the example previously described, but a third example will aid to comprehension. Let us assume that d is 400 and d' 10, that a condenser of .4 of micro-farad is used with the testing set and that a time of 100 seconds is allowed for discharge of the condenser through the unknown resistance, d/d' would evidently be 40. Select 40 on scale 3, follow a horizontal line to curve B, thence a vertical to the capacity factor line headed $C = .4$, thence a horizontal line to the time factor lines, thence a vertical down to the scale headed "Scale 4," resistance in megohms, finding 121 megohms. Considering the cheapness of the outfit necessary to this method of measuring insulation resistance, the rapidity with which tests can be made and the portability of the apparatus, there is no way whereby cable testing and all other forms of higher resistance measurements can be made so rapidly, so quickly or so cheaply.



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STORY OF THE NATIONAL ASSOCIATION

R. F. Johnson.

THE seventh annual convention of the Independent Telephone Association of the United States will be held next Wednesday and Thursday in Chicago at the Auditorium. The attendance is expected to be larger than it has been for the last three or four years, and many interesting developments are looked for. The programme prepared will be of interest to every man in any way interested in the Independent telephone business. The papers to be read, coming as they will from acknowledged leaders of the Independent movement, will undoubtedly be both interesting and instructive. Probably the report of the patent litigation committee, which had charge of the Berliner, Carty and other important patent cases, will prove the most interesting feature of the convention. Another matter that will be of great interest will be the selection of a successor to Judge J. M. Thomas, who, through THE AMERICAN TELEPHONE JOURNAL, recently announced his intention of resigning.

Ed. L. Barber.

In addition to these features, the Chicago manufacturers and supply men have prepared plans for the entertainment of all who attend the convention. The full programme is printed on page 389 of this issue.

The first Independent telephone association ever organized was the Ohio Independent Telephone Exchange Association. It was formed at a meeting of about forty representatives of a dozen or more Independent exchanges of Ohio. Judge Thomas, who represented the Home Telephone Company, of Chillicothe, was elected president, and H. D. Critchfield, secretary. The main object in organizing this Association was to solidify the Independent exchanges against the fierce competition of the Bell company.

The next move of the Independents in the way of uniting against the Bell was about a year after the formation of the Ohio Association, when an organization known as the Interstate Committee was formed. It was composed of Hugh Dougherty and George W. Beers, of Indiana; Judge J. M. Thomas and H. D. Critchfield, of Ohio, and B. G. Hubbell and J. G. Ihmsen, now general manager of the American Electric Telephone Company, representing Pennsylvania. This committee held a meeting in New York and conferred with General Eckert, of the Western Union Telegraph Company in regard to entering into a traffic agreement by which the Independents could use the telegraph wires for long distance and toll purposes. The scheme was found to be impractical at that time, however, and abandoned. The committee agreed to meet with other Independent men at Fort Wayne, Ind., for further discussion of plans for strengthening their position. At that meeting, which was held shortly after the New York conference, there were possibly ten States represented. Nothing was accomplished, however, except the calling of a general meeting of all Independent interests of the United States to be held in Chicago in April of 1897.

At the Chicago meeting more than 100 delegates were in attendance, representing exchanges in twenty States. Judge Thomas was elected temporary chairman. An adjournment was taken, the continuation of the meeting to be in Detroit on June 22 and 23, 1897. A general call was sent out to this effect, and fully 400 delegates assembled in Detroit on that date. The old Detroit Telephone Company had just commenced operation in that city, and being the largest Independent exchange then in operation, the Independents were very much interested and encouraged in inspecting its system. This was the main reason for holding the meeting in Detroit. At this meeting the present National Telephone Association was organized. Before perfecting the organization, however, there was quite a fight in the ranks of the Independents, and it looked for a time as though a manufacturing company would obtain control of the Association. The Detroit Telephone Company had organized a manufacturing branch, and a determined effort was made by it to secure control. In the end, however, the operating interests, led by Judge Thomas, H. D. Critchfield and the others, gained the ascendancy.

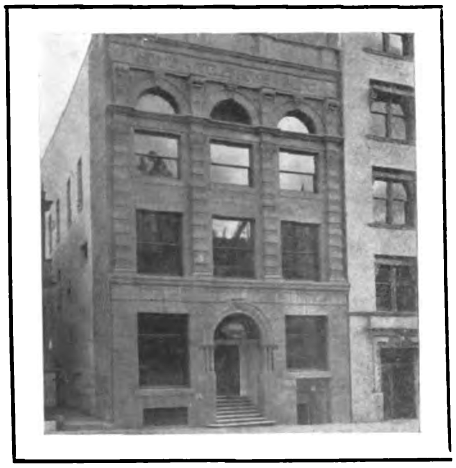
The next convention of the Independent Telephone Association was held in Chicago in June, 1898, and the year following it was also held in Chicago. The 1900 convention was held in Cleveland. In 1901 it was held in Buffalo, N. Y., and in 1902 in Philadelphia. The Chicago meeting, which is to be held on June 24 and 25, will, it is thought, revive the old aggressive spirit of the organization.

The work of the Association during the past seven years has been mainly in conducting patent litigation suits. The principal cases having been won, the aim of the Association will be to build up a technical organization that will rank with the great electrical Associations in the country.

C. H. Judson.

Wonders Worked by the Pacific Builders

By Earl F. Edmunds.



Los Angeles.
New Exchange,

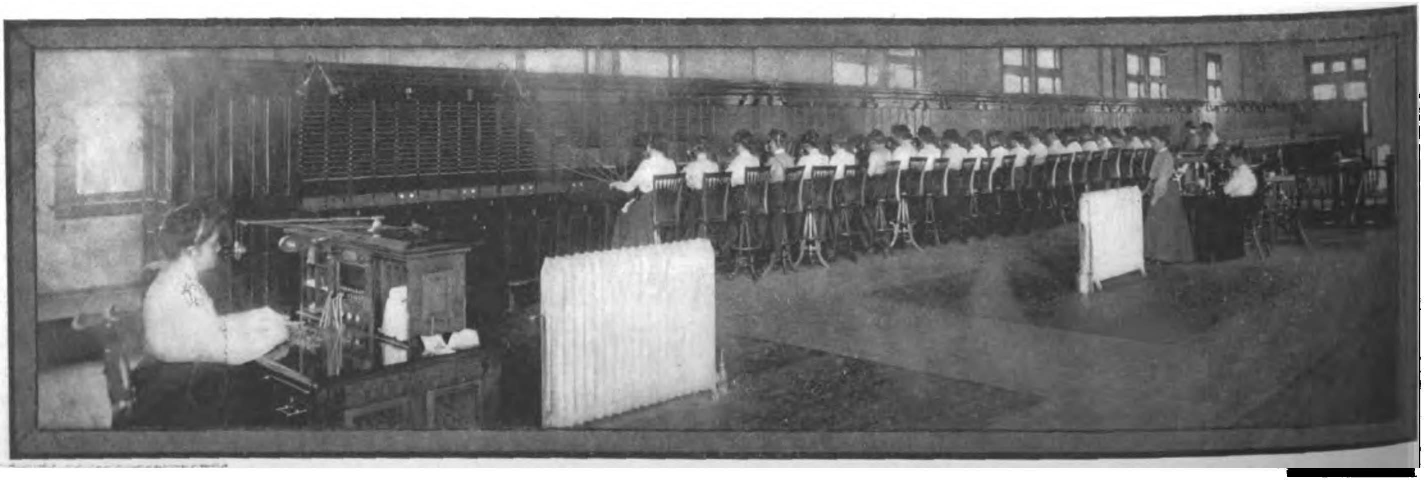
Seattle.
Main Exchange

THE story of Independent telephone development on the Pacific Coast reads like a book on the Western pioneers. A great empire has grown out of the enterprise of the western settlers. The Independent pioneers in this western empire have built up a system of telephones that is as imperial. Seattle, in the State of Washington, has one of the finest systems in the world. Los Angeles, Cal., has an Independent plant in operation that is larger even than Seattle, and built on the same modern, up-to-date scale. Portland, Ore., had an Independent plant in operation for five years. It had grown out-of-date, and the Bell Company, thinking to smother competition in that district, purchased the plant at a fancy figure. It got a plant that was almost worthless, and on the day the sale was effected the Independent leaders started a movement for a new system. They have met with great success and Portland will, in the near future, be served by an Independent exchange that will represent the latest and best in the telephone business.

Capitalists are now working on the formation of an Independent plant for San Francisco, Cal., with every prospect of success. In the smaller cities of California the Home Company, of Los Angeles, is preparing to install plants which will be connected by toll lines, thus forming a perfect Independent network all over the State. The Seattle Company is preparing to similarly cover the State of Washington, and Oregon will also be taken care of. The other "Overland" States, such as Utah, Idaho, etc., are installing Independent systems that will ultimately be as comprehensive as those now in the middle western and eastern States

The accomplishment of this gigantic work has required indefatigable labors and an abundance of faith in the success of the business. The pioneers who have built up these systems can be likened to an army general who cuts his base of supplies and marches hundreds of miles into a strange country. The Independents went into a strange country—a country in which the Bell company had a complete monopoly. The people had never heard of opposition telephony; they didn't believe it would be successful. They were skeptical as to its merits, and didn't believe it would work advantageously to themselves. And to make matters worse, local capitalists could not at first be induced to invest in the Independent plants. But in the face of obstacles that would have appalled less determined men these Western pioneers have gotten well under way, an industry that will enrich themselves and bring untold advantages to this great territory.

S. B. Claypool,
Manager Seattle Exchange.



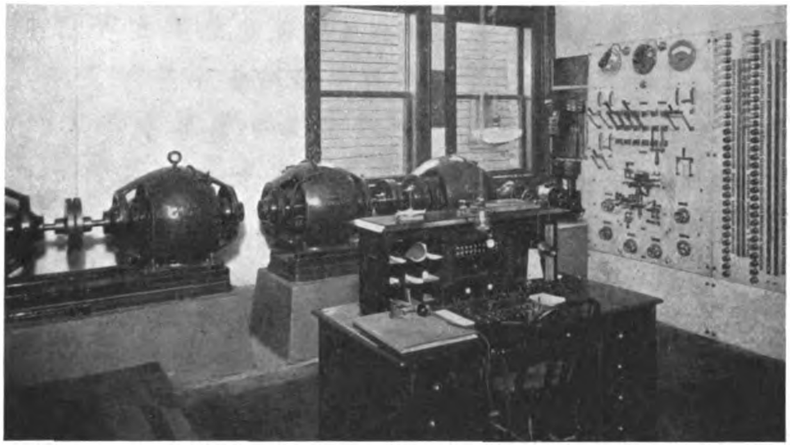
Seattle's
Main Switchboard.

Seattle: Problems Boldly Met and Conquered

By George S. Havens.

SEATTLE, WASH., has an Independent telephone system in which its people feel a just pride. As this is one of the last of the important cities to be built it has been possible to embody in the construction of the Independent Telephone Company of Seattle all of the very latest improvements in building and equipment. The entire plant is fully up to date in every particular. All of the circuits are strictly copper metallic and the apparatus and appliances are the best obtainable.

The company was organized and operates under the laws of the State of Washington, although more than 90 per cent. of the stock of the company is owned in northeast Ohio, principally in the city of Youngstown. The company has a paid-up capital stock of $600,000. The officers are: H. H. Stambaugh, president, Youngstown, Ohio; W. D. Kimball, vice-president, Seattle, Wash.; A. E. Adams, treasurer, Youngstown; S. B. Claypool, secretary and general manager, Seattle, Wash. Trustees: H. H. Stambaugh, Youngstown, Ohio; A. E. Adams, Youngstown, Ohio; Jules Vautrot, Jr., Warren, Ohio; James B. Howe, Seattle, Wash.; W. D. Kimball, Seattle, Wash.; H. H. Hine, Seattle, Wash.; S. B. Claypool, Seattle, Wash.



Main Exchange, Seattle.
Power Plant and Wire Chief's Desk.

Construction work on the plant was started in March, 1901, but owing to the unavoidable delays, the plant was not ready for service until October, 1902. Being pioneers in Independent telephony on the north Pacific the company had of necessity to bring nearly all of its tools, supplies and appliances from the east. This meant that from the time an order was mailed it would take at least 30 days to receive the consignment. Speaking more accurately, it usually took from 40 to 60 days. The difficulty of constructing a plant of this size at a distance of twenty-five hundred to three thousand miles from the source of supplies can be imagined. Everything into which labor enters is very much higher in the west, particularly so in Seattle.

Vitrified tile conduits can readily be obtained in the east delivered at almost any point at from 2½ to 5 cents per foot. With transcontinental freights added to factory costs, the delivered cost would be prohibitive for use in this section. As a substitute it was decided to use a conduit of fir wood. A square built duct was wrapped spirally with galvanized wire under a strain of 500 pounds. After careful inspection, this duct was boiled in carbinoleum. In use, these conduits were surrounded with not less than 3 inches of concrete on all sides. Owing to the ease with which this material could be handled, where there were any considerable number of duct in a trench one gang of men were able to lay it in at the rate of about a mile a day. In the underground work, 191,700 feet of this duct was used, it being accessible through 67 manholes.

Nearly all of the larger Independent companies have the very great advantage of placing a considerable part, if not a majority, of their stock in the hands of local people. This, as all telephone men appreciate, is an incalculable advantage in the building and gives a local standing to the plant. The Seattle company had absolutely no support of this nature. It is gaining from 250 to 400 new subscribers a month on superiority of its service, which is

Seattle.
Queen Anne Branch.

Switchboard.
Queen Anne Branch.

Switchboard,
Twentieth Ave. Branch.

Seattle.
Twentieth Ave. Branch.

not excelled by that given anywhere else in the United States.

The local conditions under which the system was constructed are almost exactly opposite to those existing in the east. Originally the Independent movement started in the smaller country towns that the Bell companies refused to recognize or to build. Starting with these smaller places, the Independents have been building up on through to the larger towns until now, when any important city is built, hundreds of miles of Independent toll lines are waiting for the completion of the city plant to connect up large areas, in some instances whole States, with the new city service. This is not the case on Puget Sound, as there is no Independent company operating there as yet, except the Seattle company. This company is just starting to build long distance lines and local exchanges in that locality, by which it hopes in the near future to cover all of the most important points on the Sound.

For the aerial construction, which the company claims is absolutely the finest in the world, it has used some 4,500 Washington cedar poles, ranging from 35 to 90 feet long, making an average of a fraction over 43 feet each. In the underground district, or fire limits, the "Pittsburg construction" has been used, making all distributions from a circular top pole, one pole in the centre of each block. The multiple cable system has been used to the extent of having a very few leads, in the 1,393 miles of open wire work, that have as much as one-half mile of open wire run.

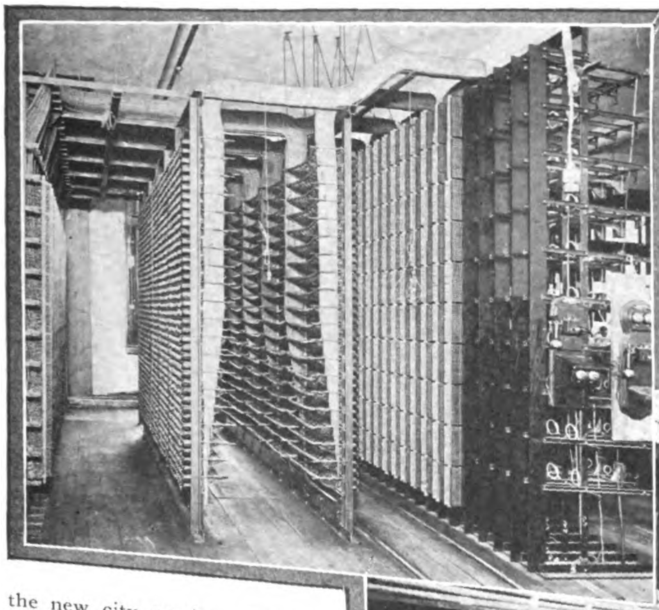
For two particular reasons, Seattle has been about the most difficult proposition in the country to build. First, the city is all built on hills, with grades ranging from 5 to 30 per cent. Second, the census of 1900 credited Seattle with a population of 80,671. A conservative estimate now places the number of inhabitants at from 130,000 to 140,000. Owing to this phenomenal increase, it was necessary to make extensions and additions to the lines and construction almost equal to double the capacity of the plant as originally contemplated.

The buildings were all designed and built under the supervision of Architect W. D. Kimball, of Seattle. The main exchange, which is 40 ft. x 120 ft., is of absolutely fireproof construction, being all stone, brick, steel and concrete. All partition walls are of expanded metal on steel channel plastered with adamant. The building is two stories in height at the main entrance on Fourth avenue, running back to an alley 20 feet lower than the entrance. This gives a twenty-foot ceiling basement room, in which all supplies are stored. The first floor is taken up by a large and handsome office the width of the building, separated from the vestibule by bank fixtures, and a large vault, back of which is the manager's private office, directors' room, men's lavatory, lunch room, operators' locker room, reception room, battery and power rooms, etc. The second floor is used exclusively as a switchboard room. The company has two sub-exchanges, one each in the northern and east portions of the city. These buildings are of brick semi-fireproof, and are built to accommodate an ultimate capacity of 3,200 each. In addition to straight metallic, the company also gives a two and four party line service. The monthly rates are: For business: Straight service, $4.00; two party service, $3.50; four party service, $2.50. Residence: $2.50, $2.00 and $1.50, respectively. All of the main line poles have tops not less than 10 inches nor over 16 inches in diameter. All of the work has been done with the idea in view that in ten years or less the city will have half a million inhabitants. At a minimum cost, the plant can be increased to its full capacity, as it was built on plans allowing for future growth to the limit of 19,000 lines. The area built covers a territory 11 miles in length by from three to six miles in width.

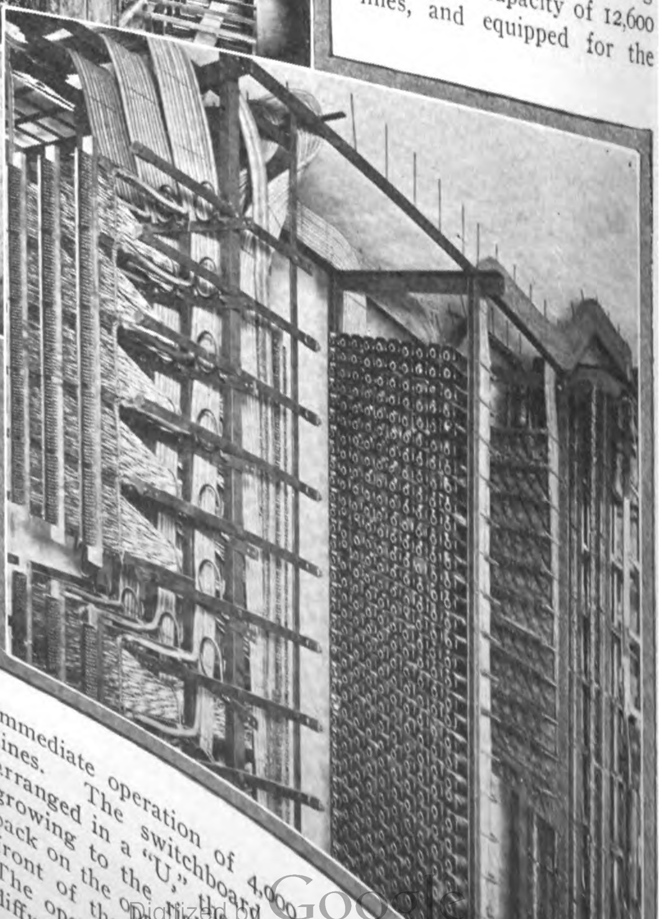
The switchboard equipment installed is the most modern apparatus that has been produced. The apparatus at the main telephone exchange and the two branch exchanges is so designed that a subscriber in one exchange can be connected with a subscriber in either of the two exchanges without the subscribers' knowledge of having a connection trunked to the second exchange.

At the main exchange there is in operation a Stromberg-Carlson lamp line signal, bridged relay multiple, central energy switchboard, having an ultimate capacity of 12,600 lines, and equipped for the immediate operation of 4,000 lines. The switchboard is arranged in a "U," the boar
growing to the right, a
back on the opposite
front of the buil
The operating
diffused
The li

Seattle.
Main Terminal Room.



Seattle.
Rear View, Main Switchboard.



Sea

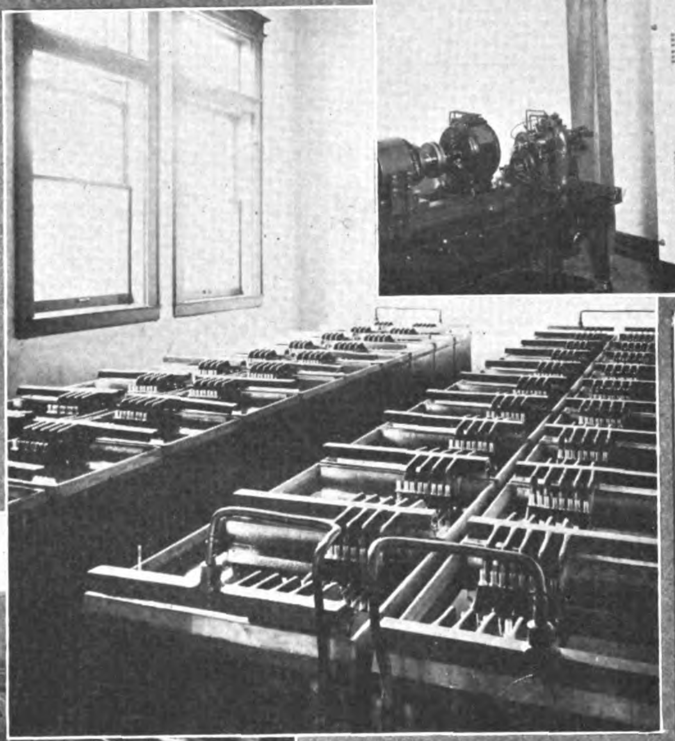
trunks, and the remaining sections are assigned for regular "A" operators' positions and fully equipped for 4,000 lines. Each equipped trunking position is provided with 24 incoming trunks, each trunk terminating on a plug and cord with associated disconnect lamps and ringing and listening keys.

Each equipped "A" operator's position is equipped with one hundred lamp line signal line equipments, line call pilot lamps, and the keyboards equipped with fifteen pairs of cords, double lamp supervisory signals, ringing and listening keys and associated apparatus. Each keyboard is likewise equipped with the outgoing trunks to the branch exchanges.

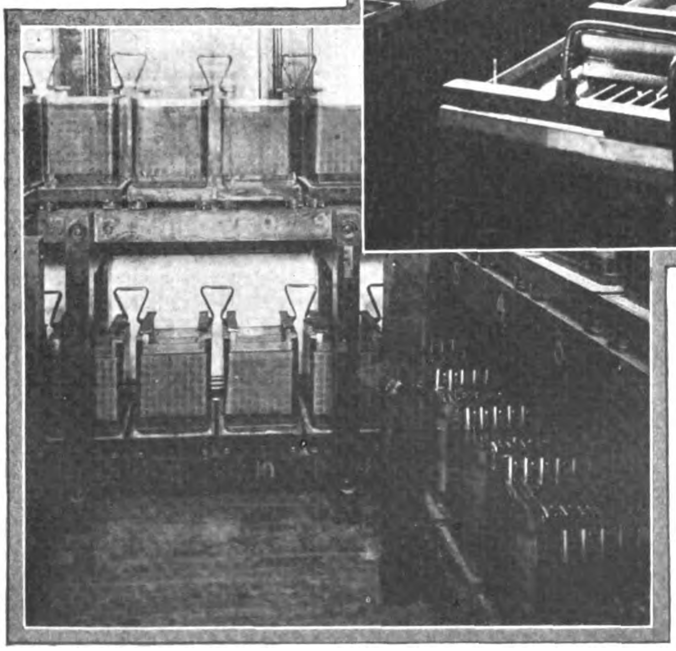
The switchboard sections are of the nine-panel type, having an ultimate capacity in the multiple for 12,600 lines, and the answering jacks space arranged for an ultimate capacity of 150 answering jacks in each of the three positions. Only 100 are equipped at the present time. Provision is made for outgoing trunk space for an ultimate capacity of 360 outgoing trunks. All exposed woodwork is of quarter sawed golden oak, finished with a piano polish.

Each section of switchboard, consisting of three operators' positions, is fully equipped for the full complement of multiple jacks corresponding to the number of lines equipped at the present time. No false floors in the front of the board or other means are required excepting the ordinary footrail and operator's chair to enable the operators to reach the multiple, even when fully equipped.

The multiple jacks are mounted in banks of one hundred. The stile strips are numbered with the hundred and thousand numbers and the individual jacks are arranged in rows of 20, each of these rows being further designated by vertical lines dividing the jacks in groups of five, thus enabling the operator to quickly and accurately select the desired multiple jack with which she desires to complete the connection. The answering jacks, which are associated directly with the corresponding lamp jacks, are provided with removable number plates stamped with the subscriber line numbers. The lamps are also numbered.



Seattle.
Main Battery Room.



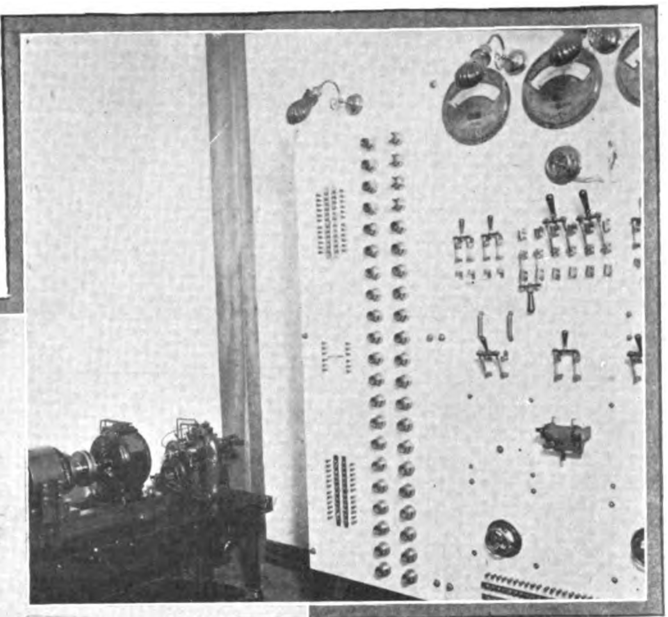
Seattle.
Queen Anne Battery Room.

The chief operator's and monitor's desks are so equipped that either the chief operator or the monitor can supervise and monitor the subscriber operators without their knowledge. In addition to these desks, special supervising operators patrol the board and maintain rigid discipline.

The terminal apparatus and power battery equipment is installed in the rear of the second floor and is arranged compactly and conveniently for the operation of the plant, as well as to economize in the amount of cable required for connecting with the switchboard. The main, intermediate and relay frames are installed parallel in sections of 800 lines capacity each, and so designed that additional sections may be added without changing or altering the present installation.

The main distributing frame is equipped on the cable side with cable terminals mounted in blocks of 25 pairs each, and numbered to correspond with the underground cable terminating thereon. On the opposite side of the main distributing frame Cook combination sneak current and lightning arresters are mounted. The relay rack, upon which are mounted all the line and cut-off relays, is arranged so that each section has the same capacity as one section of main distributing frame. The relays are mounted on mounting plates of 20 pairs each. Each pair of relays is enclosed in a tubular steel cap, so as to protect them from dust and to prevent induction from adjacent relays.

Seattle.
Queen Anne Power Plant.



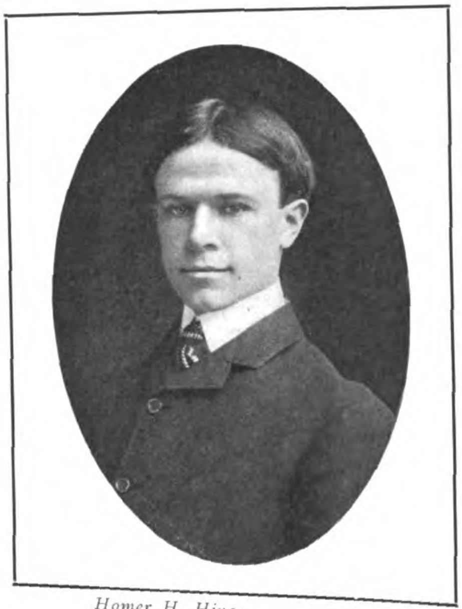
The cabling from the multiple side of the intermediate distributing frame is carried overhead on a rack to the multiple shelf of the main switchboard, 100 pair cable being used. The answering jack cables are likewise run overhead on a rack and carried to the respective answering jacks in the switchboard. All cabling is done overhead, and no cables are allowed to rest on the floor without protection, thereby preventing damage from accidental flooding.

The power and battery plant is furnished in duplicate in all respects. The storage batteries consist of two sets of lead-lined tanks of the Electric Storage Battery Co.'s "G" type, equipped with the necessary tank capacity for the ultimate operation of the switchboard, and provided with the proper number of elements for its immediate operation. Each set of storage batteries consists of 20 cells, thus providing a 40-volt system.

The battery charging apparatus is composed of two twin motor charging sets equipped with Cutler-Hammer overload and underload current starting boxes and the necessary switches and rheostats. Roth Brothers furnished the 2 ringing dynamotors, one operating from the 220 volt direct current power circuit, and the second operating from the storage battery. The alternating ringing current is generated at 100 volts. The usual howler, busy back and periodic ringing attachments are provided.

The power board consists of two Italian marble panels, each 6 ft. x 4 ft. x 1¼ inches, provided with two Weston flush type direct current ammeters, and the necessary shunts, also one Weston flush type direct current voltmeter with double scale, which reads from 0 to 3 and from 0 to 75 volts. There is a 6-circuit Crouse-Hinds voltmeter switch, one I. T. E. Midget Senior circuit breaker of the overhead and underload type, and all necessary switches and fuses. All starting boxes and rheostats are also mounted on the power board. Each switch and rheostat is provided with a designation plate to facilitate the operation of the power plant.

The wire chief's desk is located in the terminal room and is equipped with all necessary testing appliances for testing on the inside wires as well as the exchange lines. There are direct trunks for testing the switchboard, and trunks terminating on test plugs in the main distributing frame for making tests on the exchange lines.



Homer H. Hine,
Trustee of the Seattle Company.

The Twentieth Avenue branch exchange consists of a one-story building, so planned that all apparatus, operating room and operator's quarters are located on the one floor. The switchboard is designed for an ultimate capacity of 3,200 lines. It is arranged at present for 2,400 lines, and is provided with 1,000 line equipments. The Twentieth Avenue exchange is likewise equipped with a Stromberg-Carlson lamp line signal, bridged relay at the present time of multiple, central energy switchboard, consisting 4 three operator's position sections. The first section is assigned for incoming trunks, and the remaining three sections for regular exchange lines. The general equipment of the board is practically the same as that in the main exchange. A combination chief operator and monitor's desk is provided for the supervision of the operators.

The combination main, intermediate and relay racks are the same design as described for the main exchange. The power and battery plant is complete, and is provided with a duplicate set of storage batteries of the Electric Storage Battery Company's "E" type, in glass jars.

A charging set consisting of a Wagner motor direct connected to a Roth Bros. generator is used for charging the storage batteries. Two motor generators for the generation of ringing current are provided, one receiving its power from the alternating current mains and the other from the storage battery. The power board is of Italian marble, provided with a full complement of Weston instruments, and all necessary switches and starting boxes for the proper operation of the power plant. This branch exchange is connected with Main and Queen Anne branch exchange by means of a complete trunking system.

The Queen Anne branch exchange consists of a two-story building. The first floor is utilized for the terminal and power equipment and the operator's quarters. The second floor is reserved for the operating room.

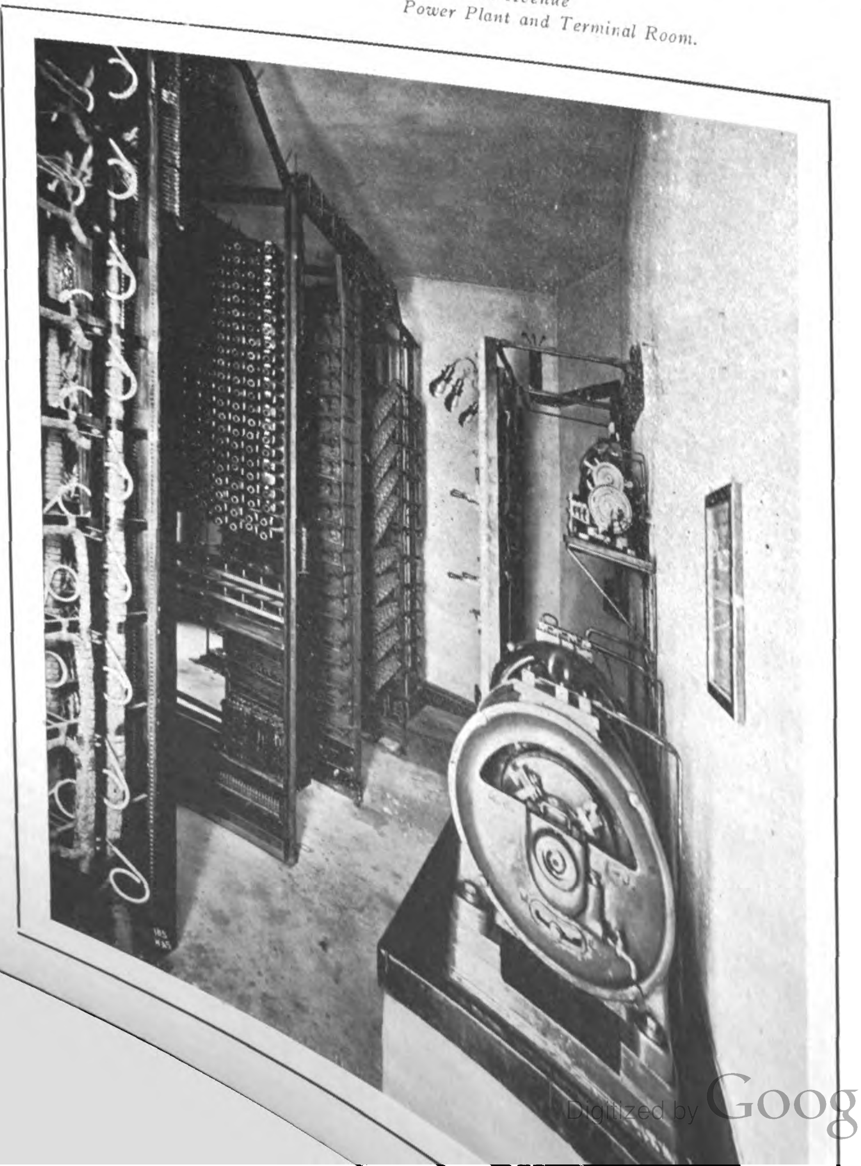
The Queen Anne equipment consists of a 3,200 capacity Stromberg-Carlson lamp line signal relay multiple, central energy, switchboard, equipped for the immediate operation of 600 subscribers. It consists of three sections. The first is assigned for incoming trunks and the second and third for regular subscribers' lines. The general switchboard equipment is the same as in the other exchanges.

In other respects, the equipment at the Queen Anne branch is the same as that given for the Twentieth Avenue branch exchange, but, however, provisions were made for a greater ultimate growth. A complete trunking system is provided for trunking with the Twentieth Avenue branch exchange, and also with the main exchange. All central office apparatus for each of the main and two branch exchanges, and also the sub-station equipment was furnished and installed by the Stromberg-Carlson Telephone Manufacturing Co., Rochester, N. Y., and Chicago, Ill. The construction of the complete plant was carried out by Mr. H. H. Hine, engineer for the Independent Telephone Co., and the business management was intrusted to and ably executed by Mr. S. B. Claypool, secretary and general manager of the company.

Every part of the installation is of the best material and no expense was spared to make this one of the ideal telephone plants of the United States.

It is hard to see how, at any time, such a thing as a cecession of service on account of lack of power would be possible. The storage batteries are provided in duplicate. Their capacity is ampl to carry the plant any tempora of powe ing

Twentieth Avenue
Power Plant and Terminal Room.

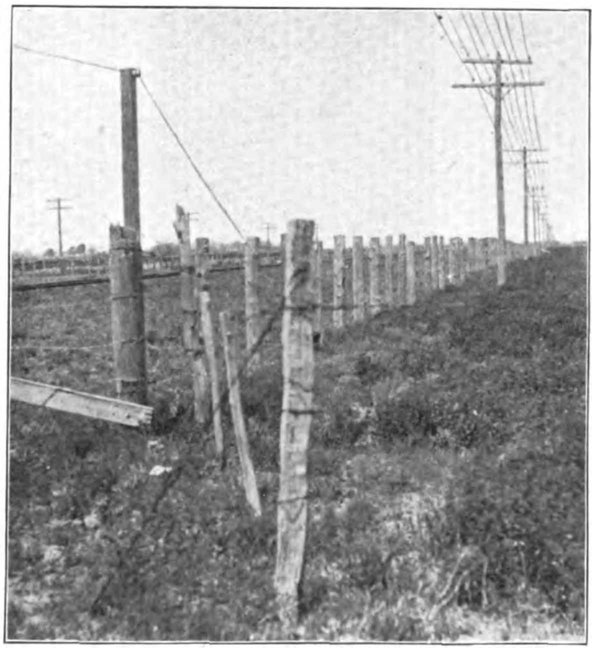


The Telephone in the Cow Country

By J. A. Carr

A FEW years ago some enterprising citizens of Garden City, which is located in Western Kansas, determined to have telephonic connection with Sherlock, a small town ten miles to the westward on the line of the Atchison, Topeka & Santa Fe Railway. After investigating the matter, they found that it would be very expensive to build a regulation pole line, and unless they found some way to reduce the cost it would be necessary to give up the project.

As almost the sole industry of that part of the country is cattle raising, it is checkered in all directions with miles upon miles of barbed wire fence. It was suggested that this fencing might be used. Upon investigation, it was found that a barbed wire fence along the railroad extended the entire ten miles between the towns of Garden City and Sherlock, and it was decided to use this. After some experimenting, the line was built, using the fence posts for poles and supporting and insulating the wire with porcelain knobs. When the line came to a gate the wire was run far enough above it so that it would be readily cleared by any vehicles passing under. This was accomplished by setting a pole on either side of the gate. The photograph shows the method of running the wire past a gate, and its connection with the line running to the town. The small white insulators can easily be discerned.



Barbed Wire Line in the Kansas Cow Country.

Two ordinary bridging telephones were connected, one at either end of the line, and the system was put into service. It has been giving excellent satisfaction.

Others readily saw what a convenience the system was and what a small amount of money it cost, and quickly followed with similar lines, so that now many other lines have been run into various parts of the surrounding country. The climate is so dry in Western Kansas that lines have been made to work admirably without attempting to insulate them at all, sufficient insulation being given by the dry fence post. Lines of this character are extremely economical to construct, and work very well indeed in dry weather, but occasionally, when there has been considerable rain, the leakage is sufficient to interfere somewhat with transmission and ringing, and instances have occurred when the grounding was sufficient to put the line out of service for a time.

When a line is quite long, it is found, in order to make the transmission good, that a metallic circuit is necessary. In order to meet this requirement, the top wire of the fence is used as one side of the circuit and the second, or middle, wire is used as a return, both of them being insulated. In Texas, where the barbed wire fences run in all directions, there are many such lines, some of them being forty to fifty miles long. Their length is dependent on the insulation which it is possible to maintain, and this is dependent on weather conditions.

One stock raiser, who has a very large ranch, has a complete system, which extends to every part of his property, and over which he can keep in touch with his subordinates. The man's holdings are so great that he has several houses on different portions of the property, in which his employees live. These are all some miles away from the main farmhouse, and before the installation of the telephone system a great deal of time and expense was entailed by the messengers whom it was necessary to employ to carry directions and mail from the main building to the sub-buildings. Since the telephone system has been put in, all directions are given over it, and in cases where it is desirable, letters to an employee whose duties take him to one of the distant buildings can be read to him. Formerly a man was constantly employed as messenger, but now much of his time is available for other duties.

Another feature of this system is the portable telephone sets that the cowboys carry with them, and which they bridge in between the fence wire and earth when they have arrived at the grazing ground. In the past a herder's life was one of the most lonesome and miserable that could be imagined. They would be for weeks out on the prairie, miles away from any house or any living person, with no companions but their dogs and horse and the cattle that they watched. The isolation was terrible, and many instances are known where cowboys have become mentally unbalanced from the strain and have wandered away from their herds. Now this is all different. In the evening the cattle can be driven to some pasture ground near a wire fence, the herder can take out his portable telephone, set and converse with his employer and friends at the main farmhouse. If any letters have come for him during the day, they can be read, and any interesting bit of news can be related. Thus the herder is kept in touch with the world almost as well as if he were at the town.

His employer knows the condition of his stock as well as if it were under his own personal care. If at any time it is necessary, for financial or other reasons, a herd can be brought to the headquarters in much less time than was formerly possible, as instead of a messenger having to go to the grazing ground to deliver an order to the cowboy, it is possible for him to be reached over the telephone. The herder is instructed to call in to headquarters a certain number of times a day at some specified time. If the calls are not received when they should be, it is an indication that there is something wrong, and, when deemed necessary, an immediate investigation can be made. This ranch system has proven itself so indispensable that it will never be abandoned. Its great utility has long since paid for its cost of installation.

ROMANTIC USE OF A TELEPHONE BOOTH.

A RESOURCEFUL Joliet, Ill., young lady wished to elope with the young man of her choice. Her stern father stood in the way of any such move, by closely watching his daughter and never giving her the desired opportunity. Last week Miss Mary—that is her name—noticed her father step into a telephone booth. She, being a rapid thinker, saw the long looked for opportunity and quickly locked the booth with her father inside. Then going to another telephone, called her father up and said:

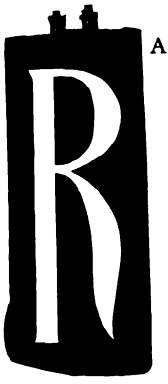
"Papa—you're whipped. I'm going to run away with Harry, and—I'm—going—to—do—it—right—away."

She and Harry did run away, but got only as far as Chicago, where Miss Mary's father, who had in the meantime broken from the booth, overtook them. Harry was placed in jail on a charge of abduction, served by the angry father. Miss Mary went back to Joilet.

RACING HORSES BY TELEPHONE

MODERN ADAPTATION IN CHICAGO

Written by F. L. MARTIN.

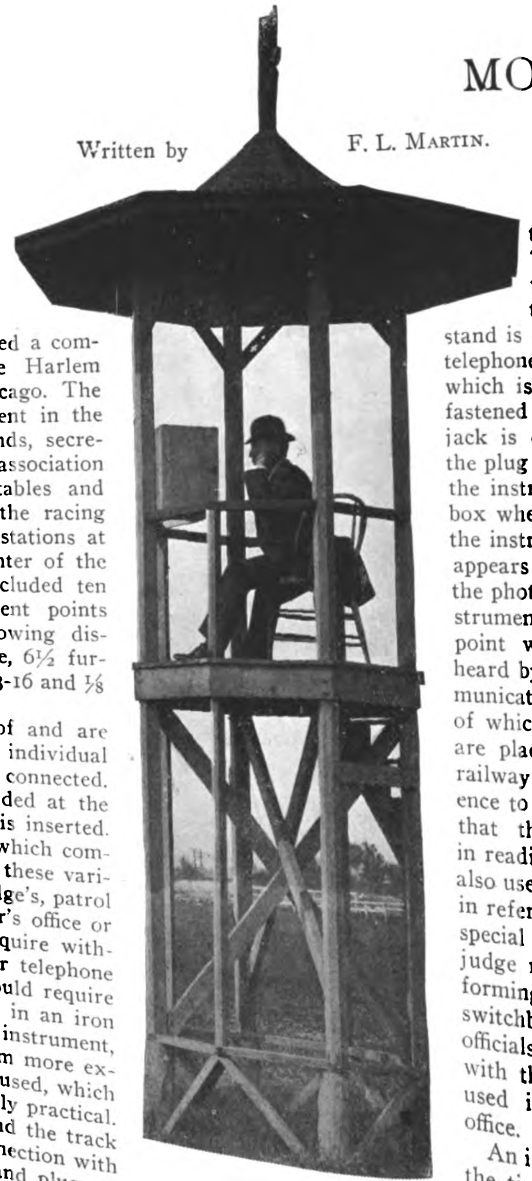


Pocket Telephone in Case.

RACING horses by the aid of the telephone is one of the latest uses to which it has been adapted. The Harlem Jockey Club of Chicago, Ill., has just installed a complete telephone system at the Harlem race track, in the suburbs of Chicago. The equipment includes an instrument in the judge's and patrol judge's stands, secretary's and manager's office, association barn, ticket offices, various stables and every important point within the racing track. There are also several stations at different points around the center of the track. In the equipment is included ten jack boxes, located at different points around the track at the following distances from the judge's stand: ¾ mile, 6½ furlongs, 6, 5½, 5, 4½, and 4 furlongs, ¼, 3-16 and ⅛ mile.

These jack boxes are weather proof and are built of cast iron. They contain an individual spring jack, to which the line wires are connected. An opening with a trap door is provided at the bottom of the box, in which the plug is inserted. These jack boxes provide a means by which communication can be established between these various points around the track and the judge's, patrol judge's, secretary's or general manager's office or other places where occasion might require without the necessity of locating a regular telephone instrument. The latter installation would require either an expensive instrument put up in an iron case or a booth for protection to the instrument, either of which would make the system more expensive than the style of construction used, which has demonstrated itself to be thoroughly practical.

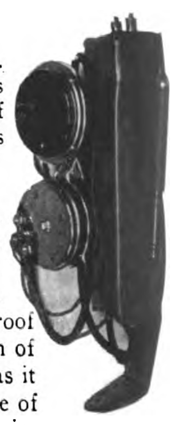
At each of the starting points around the track is located one of these jack boxes, connection with them being made by a flexible cord and plug attached to a small pocket telephone put up in a leather case. The pocket telephone and its carrying case, and also several scenes at the track in which the telephone is being used are shown in the accompanying photographs. One of them shows the starter telephoning to the secretary's office regarding some matter in connection with the horses which are to start in a race.



Patrol Judge Using the Telephone.

A call is made from a jack box by inserting the plug attached to the pocket telephone in the jack. This operation displays a signal at the switchboard where connections are made between the various stations of the system. The line wire is supported on porcelain knobs fastened to the fence posts. The jack boxes are fastened to the fence posts placed at about 32 feet apart. At places where the wires cross the track or gates they are carried in a galvanized iron pipe, placed underground.

The patrol judge's stand is at the south end of the track, its object being to detect any fouls on the turns. Communication can at once be established between the patrol judge and the judge at the finish should occasion demand, by means of the telephone located in this stand. The instrument in use at this point is a regular wall set placed in a suitable cabinet to protect it from the weather. The patrol judge using this telephone is shown in one of the photographs. The judge's stand is equipped with a regular desk telephone with flexible cord and plug which is inserted in the spring jack fastened on the top of the stand. The jack is conveniently located so that the plug may be easily withdrawn and the instrument placed in a weatherproof box when not in use. An illustration of the instrument in the judge's stand, as it appears in actual use is shown in one of the photographs. The ringer for this instrument is supported on the ceiling at a point where the signal may be easily heard by the judge should any party wish to communicate with him. At the various main gates, of which there are three, regular wall telephones are placed. These instruments are used by the railway agents for calling up the judge in reference to when the races will probably end in order that they may have their trains placed and in readiness for the departing crowd. The judges also use these instruments for calling up the agents in reference to the time of departure of regular or special trains. After the last race has started, the judge may call up the switchboard operator, informing him when the races will be finished. The switchboard operator in turn informs each of the officials at the different gates. A desk set identical with the one shown in the judge's stand is also used in the secretary's and general manager's office.



Pocket Telephone, Showing Plug.

An illustration of the advantage of the telephone, the time it saves, and perhaps serious difficulties overcome by its use is shown quite clearly by an incident that took place previous to the start of the $10,000 handicap race on June 6, 1903. The start took place at a short distance south of the judge's stand, and in consequence a large proportion of the crowd began to move in this direction, all anxious to see the start. There were probably 30,000 people present on this day. At this point the fence is made sectional so as to be easily removed in case of steeplechases; consequently, it was not safe for the crowds to lean against. The starter took out his pocket telephone, called the telephone operator by inserting the plug in the jack box. He secured connection with the proper parties and instructed them to send police to that point at once to keep the crowd back. Almost before one could have sent a messenger to deliver this order verbally, the police were on the spot and the crowd forced back to a safe distance. This also permitted of obtaining the photograph of the start, which would have otherwise been impossible. One can hardly conceive of th

trouble that migh

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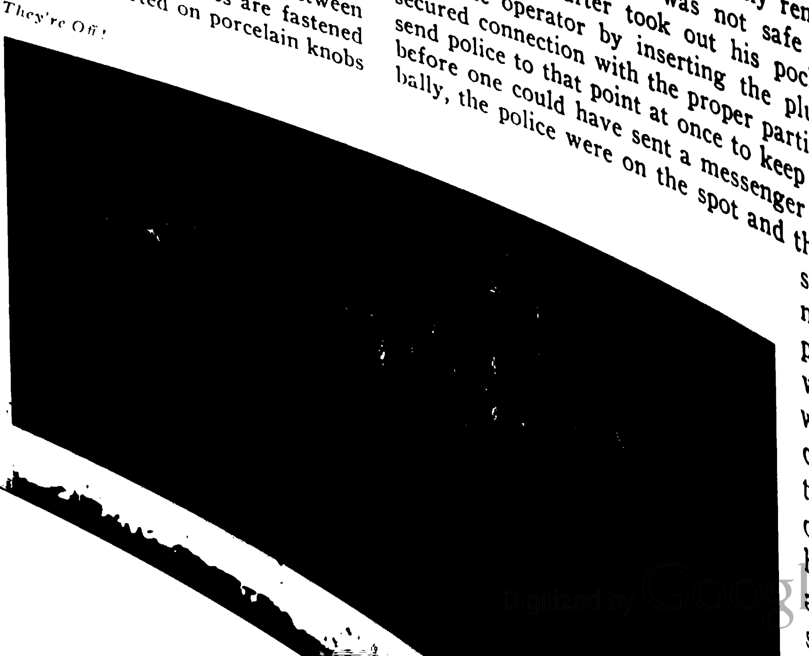
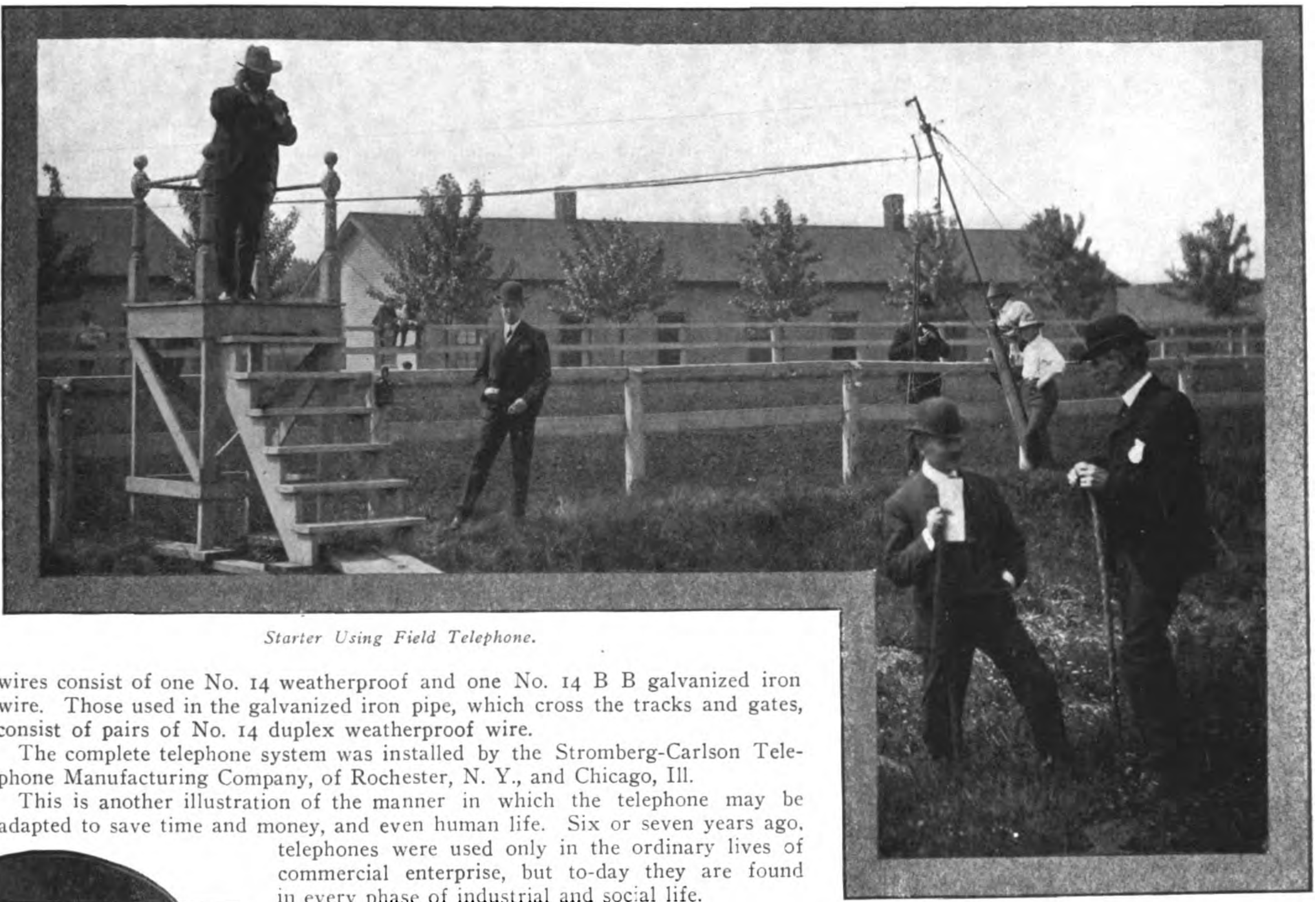
They're Off!



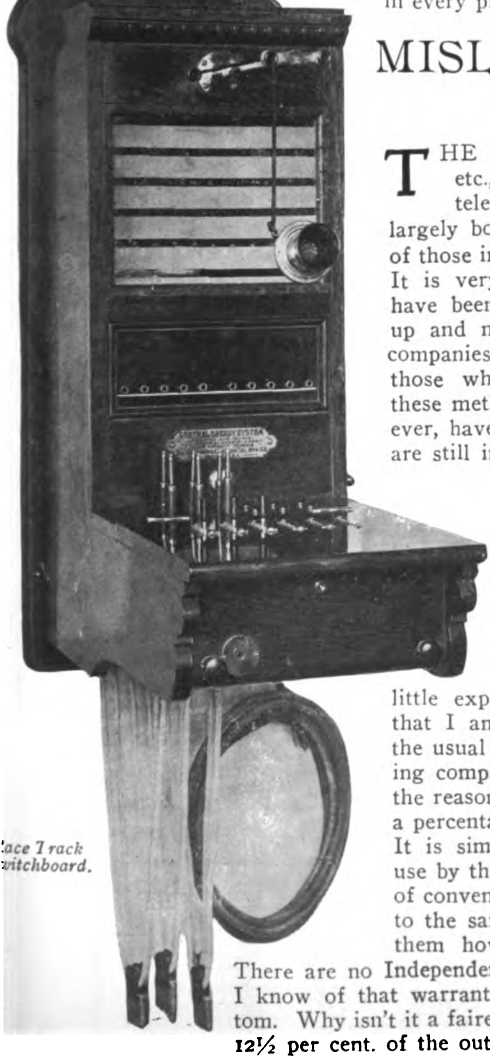


Starter Using Field Telephone.

wires consist of one No. 14 weatherproof and one No. 14 B B galvanized iron wire. Those used in the galvanized iron pipe, which cross the tracks and gates, consist of pairs of No. 14 duplex weatherproof wire.

The complete telephone system was installed by the Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y., and Chicago, Ill.

This is another illustration of the manner in which the telephone may be adapted to save time and money, and even human life. Six or seven years ago, telephones were used only in the ordinary lives of commercial enterprise, but to-day they are found in every phase of industrial and social life.



ace Track witchboard.

MISLEADING TELEPHONE PRECEDENTS

By George R. Fuller.

THE systems, forms, methods, etc., of the early Independent telephone companies were largely borrowed from or imitations of those in use by the Bell companies. It is very natural that this should have been the case, as the building up and management of the various companies were placed in the hands of those who have been schooled in these methods. Many of them, however, have been abandoned and some are still in vogue. One in particular is still followed that I consider most absurd. I refer to the division of toll lines. I do not criticize the customary percentage of division between the toll companies and the exchanges. Personally, I have had so little experience in these divisions that I am not prepared to say that the usual 25 per cent. to the originating company is not fair, but what is the reason or justice in allowing only a percentage on originating business? It is simply one of the customs in use by the Bell Company as a matter of convenience. All income going into the same pot, it mattered little to them how the division was made. There are no Independent telephone conditions that I know of that warrant the following of this custom. Why isn't it a fairer way to give the exchanges 12½ per cent. of the outgoing and 12½ per cent. of the incoming business, paying them for the work they do, rather than giving them credit only for the business one way? The business one way never exactly equals the business the other way. The conditions might be such as to bring more toll business into an exchange than would ever originate there, and vice versa. Wouldn't it be just as reasonable a custom say for railroad companies to make their division of fares only on a basis of originating business? Whoever heard of a trolley company in any city receiving a percentage of through fares to other towns only on passengers carried out of that particular town, and receive no proportion of the fares of passengers brought into the town. I see no reason why it would not be just as sensible a method as the one in use by the Independent telephone companies.

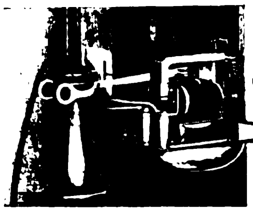
FARMER'S TELEPHONE AS A FIRE ALARM.

MR. HENRY PARK, a farmer residing in the town of Canaan, N. Y., is beginning to appreciate the value of having a telephone in his home. A telephone line was recently constructed by Mr. Park and his neighbors, which connected all of their houses. Heretofore, the system has been used only for general gossip and for such little business matters as always come up on a farm. After the lines had been installed, a system of signals was agreed upon by the farmers, which was so arranged that a given number of rings, either long or short, would have some specific meaning. One of the signals —a succession of short rings—meant that the giver was in trouble and wished to sound a general alarm, the agreement being that all of the other farmers should immediately go to his residence and give him whatever assistance was needed.

A few days ago Mr. Park saw sparks issuing from his chimney and, upon investigation, found that his house was on fire. The flames had gained considerable headway before he discovered them. Immediately he ran to his telephone, gave the general alarm, and in the nick of time his friends were on hand. By working hard for a time they soon had the flames under control.

A SYSTEM OF SELECTIVE RINGING FOR TELEPHONE LINES

By William W. Dean.



ALTHOUGH the title of this article is "A System of Selective Ringing for Telephone Lines," it might be of interest and value to spend a few minutes in explaining and showing the defects of the method of selective ringing at present almost universally used. I will not attempt to take up selective party line systems, as a whole, because this subject has been discussed in a very perfect manner by Mr. Thomas D. Lockwood in his paper before the American Institute of Electrical Engineers in June, 1892. His discussion carries us up to the year 1892, since which time only two systems of any importance have been developed—one by Messrs. Barrett, Whittemore and Craft, commonly known as the B. W. C. system; and one by Mr. Angus S. Hibbard, of the Chicago Telephone Company. The B. W. C. system has been abandoned on account of its complexity, but the Hibbard system, in its original and modified forms, is in almost universal use to-day.

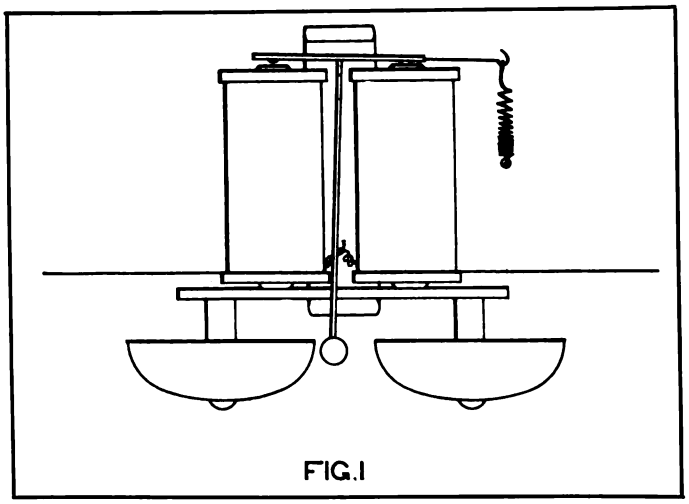
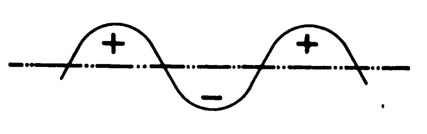


FIG. 1

The Hibbard system was the first really commercial selective ringing system ever brought out. In this system the bells are so arranged as to respond to current of one polarity only. To accomplish this result, ordinary polarized telephone ringers are used, with the addition of a spring to hold the armature normally against one of the pole pieces (Fig. 1). These bells have been appropriately called "biased." It is evident that by this method only two selections can be obtained, so that in order to secure four party selective ringing, one bell of each polarity must be connected to earth from each leg of the metallic circuit, the bells being operated by pulsating currents of proper polarity (Fig. 2). So far it has been impossible to obtain a really first class ring from bells of this class. In my opinion, the trouble is due to three things—variation in spring tension, variation in voltage of ringing generators, and variation in frequency.

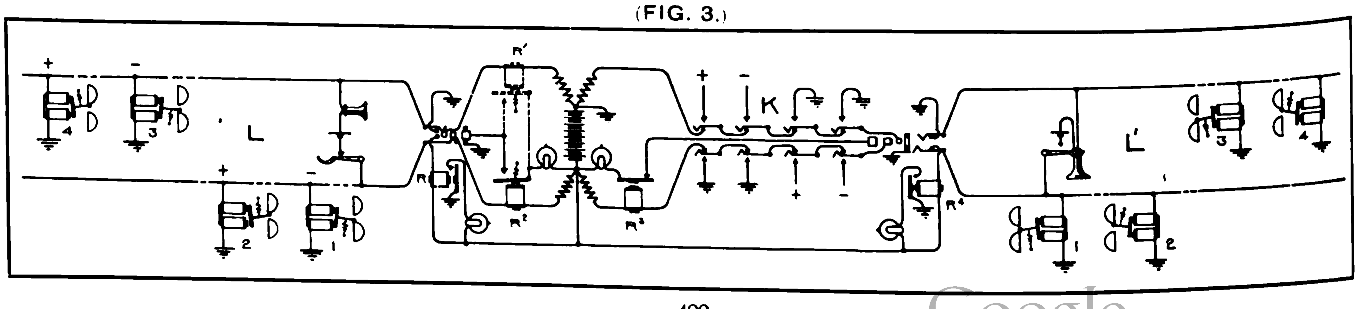
FIG. 2

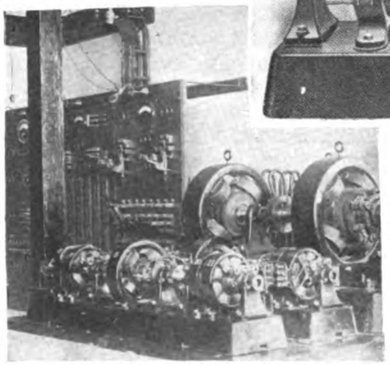


The first difficulty could be overcome by proper design, probably meaning breaking away from old models entirely. The second and third difficulties could be remedied by using a self-exciting generator, driven by a governed motor. Considerable difficulty is also experienced in adapting this system, in its original form, to standard common battery boards. It is impossible to place a condenser in series with a biased bell, because the charging and discharging of the condenser produces the same effect as an alternating current, so that the ringer would respond to currents of either polarity. It is evident that current flows from the central battery, through two of the bells in multiple, so that the line and supervisory relays must be adjusted so as not to operate through these resistances, and to operate through the combined resistance of the subscriber's sub-station apparatus and line (Fig. 3). It will be seen, then, that these relays work on what we call a margin. In order to increase this margin, it has been customary to wind the bells to 2,500 ohms resistance and then insert a small resistance coil of from 5,000 to 20,000 ohms resistance in series with it. One of the first remedies for the marginal relays is to put both the line and supervisory relays on the ground side of the battery (Fig. 5), but inasmuch as most of the Bell companies are working mixed lines (ground and metallic circuits), it is evident that this is impossible. By far the best remedy proposed for the latter difficulty was invented by Mr. C. E. Scribner, and shown in his patent, No. 649,076. For some unknown reason this system has never been used.

In Figs. 3 and 4 I have shown the principle of the Scribner method in dotted lines. Referring to Fig. 4, which represents a grounded line subscriber, the earth connections must be removed and the tip side of the spring jack connected to the battery B by the dotted line A^1. The left-hand side of the cord circuit (Fig. 3) is equipped with the Scribner system. In this circuit a relay R^1 is furnished, in addition to the regular supervisory relay R^2. When the plug is inserted into the jack of a party line subscriber, the relay R^2 is immediately operated by current flowing from the battery through the bells 1 and 2 to

(FIG. 3.)





Ringing Generators in the Frontier Telephone Company's Exchange, Buffalo.

FIG. 12

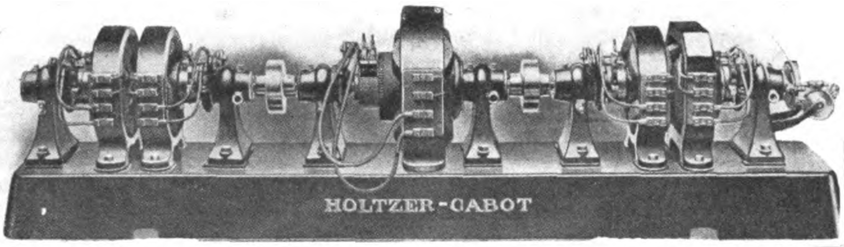
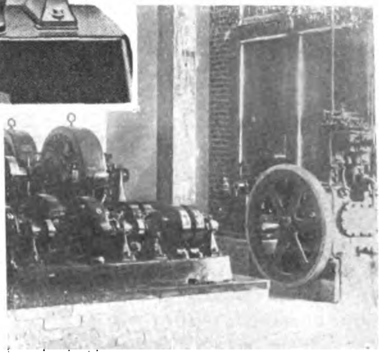


FIG. 8

Multicycle Ringing Set for Telephone Signaling. The Motor is in the centre and two Generators are shown at either end.



Currents of 2000. 4000. 6000 and 8000 alts. per minute are generated.

FIG. 13

earth; but the operation of the relay R^1 is dependent upon the subscriber's telephone hook. It is evident that in this system neither of the supervisory relays R^1 and R^2 have to be adjusted on a margin. When the plug is inserted in the jack of the grounded line (Fig. 4), current flows from the battery B via wire A^1, the tip of the spring jack and plug, the relay R^1 to earth. The relay R^1 is thus rendered inoperative when used in connection with grounded lines, and the supervision is obtained by means of relay R^2.

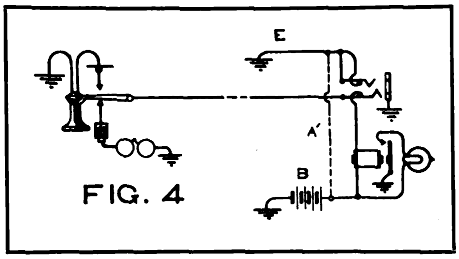
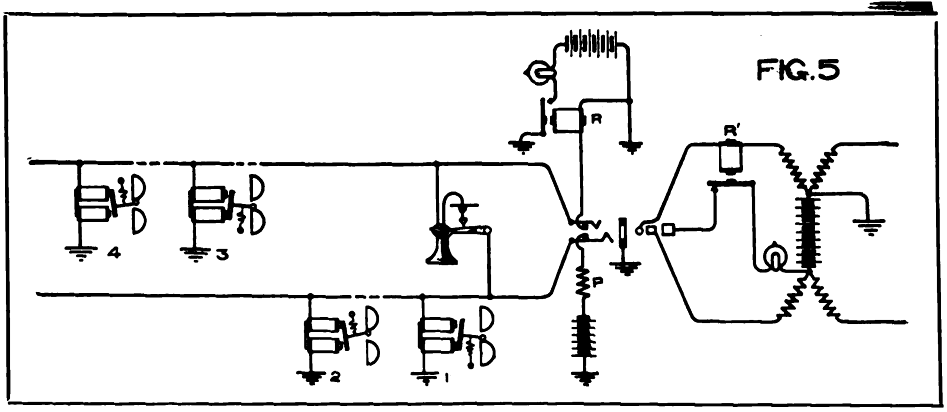


FIG. 4

The modification of the Hibbard system most commonly used is the one invented by Thompson and Robes, and disclosed in patent No. 644,647 (Fig. 6). In this system each station is provided with a relay specially designed for use with alternating currents, which relay is placed in series with a two M. F. condenser, the combination being bridged directly across the telephone line, there being four such bridges in a four-party line system. The contacts of these relays when operated are arranged to connect the usual biased bells to earth from each leg of the metallic circuit, such connection being made only during the process of ringing. The invention is best described by quoting from the above mentioned patent, as follows:



"This invention relates to selective signals for telephone circuits, and in particular to that class wherein plus and minus circuits may be transmitted at will over either or both conductors of a metallic circuit, the signal receiving devices of the several stations being connected in branches to earth from the said main conductors, respectively. In organizations of this class heretofore permanently connected, earth branches have exclusively been employed, and it has therefore been impracticable for obvious reasons to arrange a four-station metallic circuit so fitted for operation in connection with a common battery or central energy system of transmitter and incoming call signal current supply.

"The object of the present invention is to provide a system of selective signaling for association with four-party metallic telephone circuits, which, though involving the connection of the signaling instruments at the several sub-stations in earth or ground branches from one or the other of the main circuit conductors, shall have all of the said ground branches primarily detached or disconnected from their main circuit conductors, respectively, but so arranged that they shall be fully available for use in connection with the said main conductors when a signal is to be selectively transmitted to any sub-station."

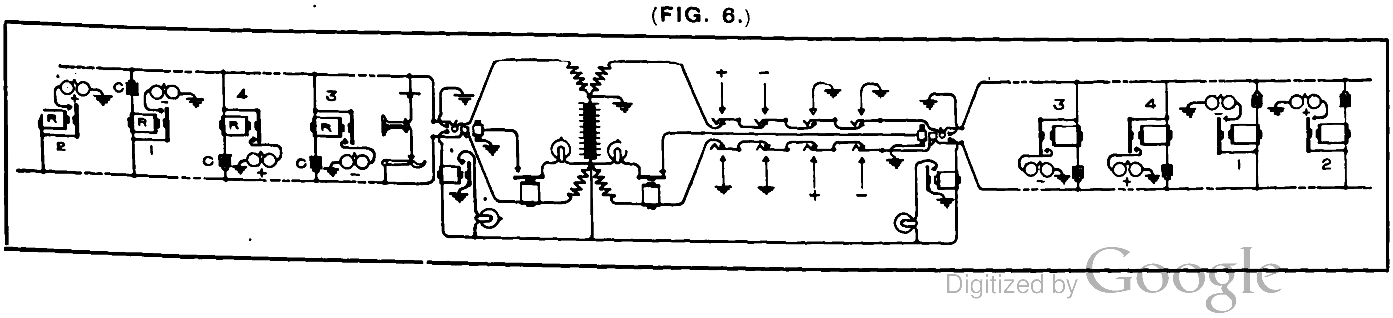
It is interesting to note the following sentence of the specification: "In such a system the main circuit, normally and when actually in use as a talking circuit, is maintained free from and untrammeled by earth connections, and is therefore in a condition of much higher efficiency than otherwise could be the case." This sentence, I think, discloses the real value of the Thompson system. As far as central office signaling is concerned, Mr. Scribner's method is the best solution.

It has always seemed to me that this system was a step backward in the telephone art, inasmuch as every party line subscriber's sub-station apparatus had to be provided with a specially designed relay. It is contrary to modern telephone practice to complicate sub-station apparatus in any way, the whole tendency being to put all necessary complications in the central station, thereby reducing the maintenance and trouble to a minimum.

Several other very serious objections exist in party line systems which connect bells to earth. First, it costs money to install and maintain earth connections; second, when you are ringing a subscriber, and he removes the telephone from the hook during the process, the subscriber of like polarity or frequency on the other side of the line is also rung; third, bad inductive troubles are brought in by these earth connections, except in the case of the "Thompson and Robes" system, where the earth connections exist only during ringing.

When I was called upon to design a party line system, I decided

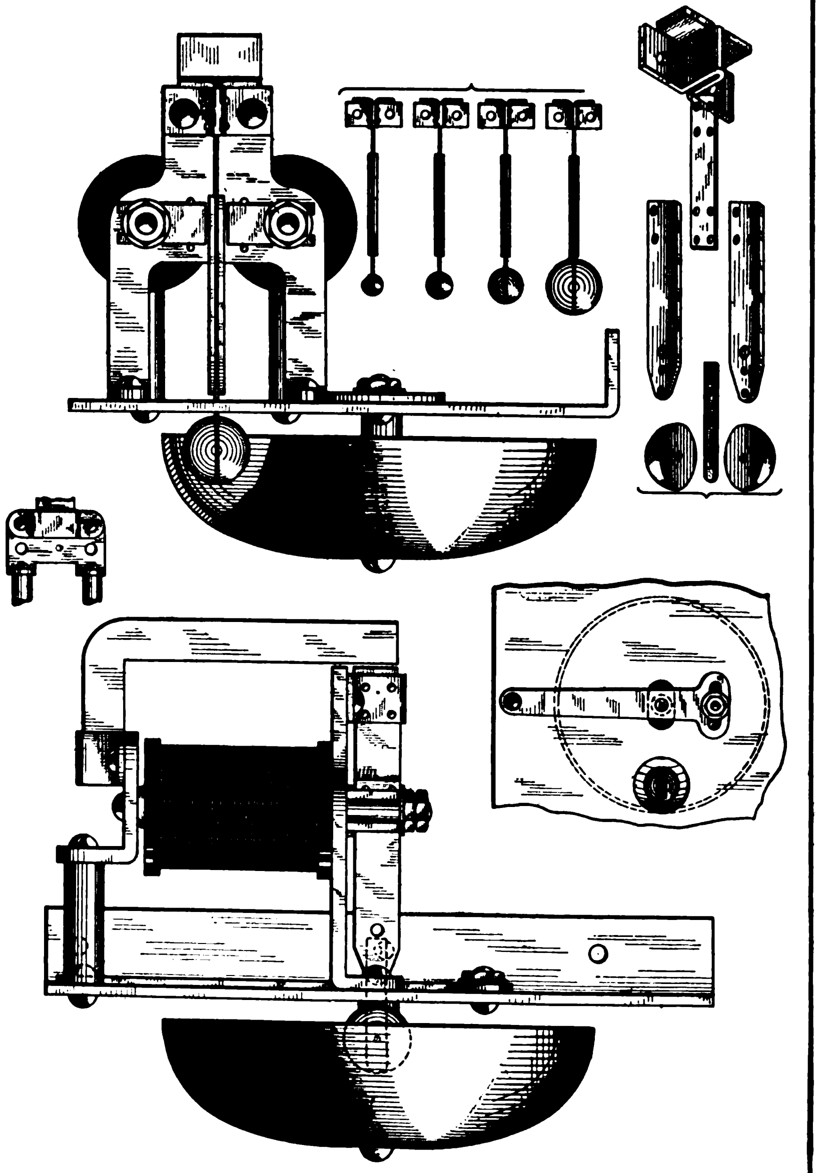
(FIG. 6.)



that the following things were desirable: No grounds, no relays, no adjustable springs, no step by step mechanism, and that the ringing of the bells should not be appreciably affected by either the resistance or capacity of the line. Leaving out the above possibilities, I was practically limited to some kind of a harmonic system, in which the gong should be struck directly by the tuned armature.

Quite a number of harmonic party line systems have been developed by Gray, Currier, Lighthipe and others, but none of them have been a great commercial success. My opinion is that the lack of success has been due to poor mechanical design and lack of governed generating outfits. All of the old harmonic systems used some form of interrupted battery current as a source of ringing, and my experiments have taught me that success is not to be expected along these lines. The design of a harmonic party line system looked very simple two years ago, but I received some very heavy setbacks as soon as I commenced the actual experimental work. A large number of these selective telephones had been sold before they were even designed, so that there was no chance to back out. My experiments have taught me that it is useless to try a non-polarized device; that adjustable springs and weights were not desirable; that it is practically impossible to operate a tuned bell of the type mentioned by means of a pulsating or alternating current of the frequency or pitch corresponding to the natural rate of vibration of the tuned armature. In this party line system I apply to the lines ringing currents having frequencies corresponding to the operative rates of vibration of the reed tongues of the bells, and which are resultant of the natural pitch of the reed as modified by the weight of the hammer or ball, and the action of the bell gong when struck. Thus, the modification, so far as the gong is concerned, is in the line of acceleration, so that the operative pitch or resultant characteristic of the device as a whole is something higher than the pitch of the weighted reed alone. In other words, the gong in being rapidly struck serves to accelerate the vibrations of the armature.

FIG. 7



I have also found that the armatures used must be very rigid—almost to the point of junction to the tapper—but that the connection between the armature and the tapper must be flexible or else the bells will not ring. Fig. 7 shows two views of the new bell and some details of its construction. Another important point is that the best results are obtained by using one gong. When two gongs are used, the tapper can never be made to strike more than one. I have experimented with constant weights and variable springs, and adjustable weights and springs, but finally decided upon the constant spring and the variable weight. The only exception to this rule is in the case of the armature responding to the lowest frequency. Here I weaken the spring slightly by punching a hole in it in order that the diameter of the tapper be not excessive. I also decided that the different members of the armature should be riveted solidly together, so that the trouble man and the installer would have absolutely nothing to adjust, because it has been my experience that where there are many things to adjust they are almost always out of adjustment. I can remember when I was a telephone inspector that I was very much disgusted when the solid back transmitter came into use. Having been used to the old Blake transmitter, I felt lonesome without having something to adjust. As worked out, the only adjustments necessary in this party line system are of the pole pieces of the magnet and the gong, these being necessary to take up variations in manufacture. In determining the proper weights, I had balls made of all diameters, within certain limits, varying about 1-64th of an inch. These balls are made in halves and held together by small screws. Among other things to determine in the development of an harmonic party line system is what frequencies are to be used. I decided that it was best to use as low frequencies as possible, because the very high frequencies would be apt to produce bad inductive troubles in the switchboard and on the lines. I found by experiment that it was impossible to get a satisfactory ring under 1,000 cycles. I find that Prof. Gray, in his harmonic telegraphs, used the first, third, fifth and seventh flat of the octave, but commercially it would be impossible to reproduce these notes with dynamos, because it would be necessary to drive them with belts or gears in order to obtain these frequencies. I decided that the only satisfactory way would be to have four direct connected machines. Consequently, starting with 1,000 cycles per minute, I had to use a two-pole machine driven at 1,000 revolutions, and step up by using a four, six and eight-pole machine. The currents I had to work with them were two, four, six and eight thousand alternations per minute. Although some of these notes were octaves, I found practically no tendency to interfere. In fact, I was told by Mr. Goodrich, a former assistant of Prof. Gray's, that their experiments showed that there was very little tendency to interfere between notes in different octaves.

One of the first things I found out in my experiments was that it was impossible to expect to have a frequency system and have the dynamos driven by commercial power circuits without some method of governing; so that one of the first things I was compelled to develop was a governor for my motor. In designing a governor, I worked along the lines laid out by Edison, Gray and others, and have obtained satisfactory results. The method of governing is as follows: Say that a motor is desired to run at 1,000 revolutions per minute, and decide that a certain variation in the power circuit is allowed. The motor is so constructed that it will run at 900 revolutions on the highest voltage it can ever get. I then introduce in the field of the motor a resistance which will tend to make the motor run at 1,100 revolutions on the lowest voltage it can ever get. On the shaft I place a small governor, a diagram of which is shown in Fig. 9, which makes one contact, the function of this contact being to short circuit the speeding resistance. Now, all that is necessary is to adjust this contact until the machine runs at 1,000 revolutions on its normal voltage, and then the governor will take care of all variations in voltage and load. For instance, with a motor which would run at 1,000 revolutions on 220-volt circuit, I have been able to raise the voltage 50 volts and lower it 50 volts, making a total variation of 100 volts, and have the motor run within less than 2 per cent. variation in speed. The first governors made were so constructed that they could be adjusted while the machine was running, but I have found that the advantages in this method were more than overbalanced by the complicated mechanism introduced. The two one-horse-power outfits installed in the Frontier Telephone Company's exchange at Buffalo, of which two views are shown in Figs. 12 and 13, have now been running for over a month with practically no variation in speed. I have developed several forms of rotary pole changers to be used in small exchanges which would not stand the expense of a dynamo outfit. These pole changers interrupt a primary battery at four different frequencies. I would not advise the use of this method if it can possibly be avoided, as bad inductive disturbances are apt to be introduced in this way; and in the long run it would be very much cheaper to install a first class dynamo outfit. I think the same kind of a governor herein described should be applied to the ringing outfits used in connection with party line systems in which biased bells are used, except that the generating machines should be self-exciting and driven by direct connected motors. Fig. 10 shows a diagram of the system as applied to a common battery plant, and Fig. 11 shows the wiring of the sub-station bells. It will be noticed that the coils of the two low frequency bells are in series, while those of the two high frequency bells are in parallel.

FIG. 9

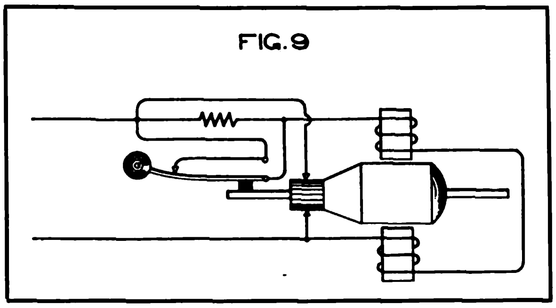


FIG. 10

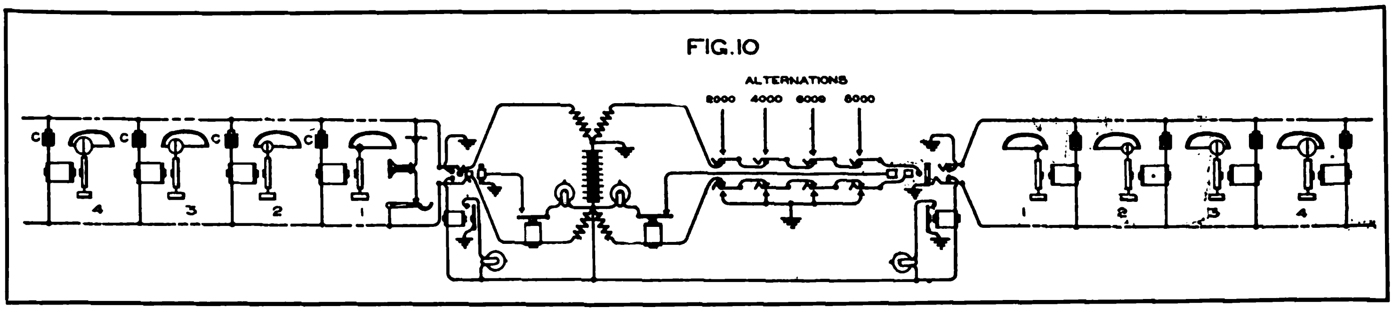
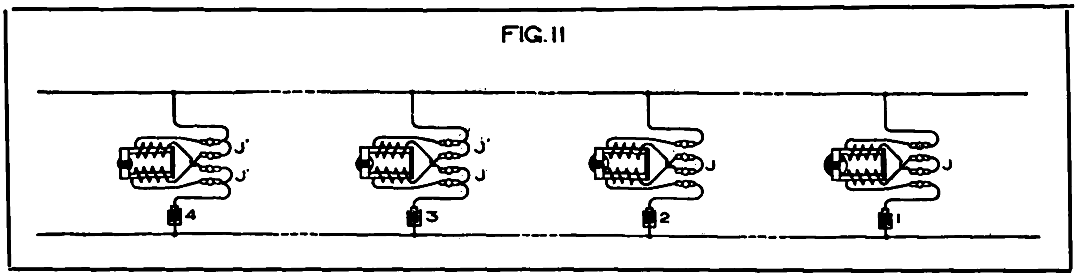
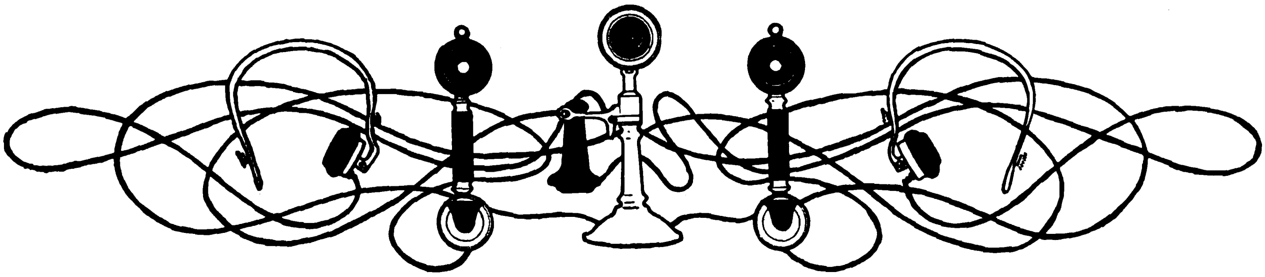


FIG. 11



I wish to say that my twenty years' experience has more than ever convinced me of the advisability of simplifying the subscriber's sub-station apparatus in every possible way, even at the expense of very complicated outfits in the central office. The amount of trouble in sub-station apparatus is practically proportional to the number of parts. If there are twice as many parts, sooner or later these parts will get into difficulty, and trouble reports will show twice as many repairs.



Editor's Note—Paper read before Chicago Branch, A. I. E. E., May 19, 1903.

The Editor's Page.

A LARGE ATTENDANCE EXPECTED

It is to be hoped that the attendance at the National Convention next week will be large. For the past few years interest in the National Association has lagged considerably and its annual meetings have not called out the number of practical telephone men such gatherings should. The reasons for this have been manifest, and The American Telephone Journal has not hesitated to point them out and suggest a course to put an end to the general apathy. The Association had fallen too much under the domination of one set of men and its affairs had not been pushed with the vigor such organizations demand in order to keep interest alive. It is fair to assume that both of these hampering conditions will now disappear. Judge Thomas has formally announced, through the columns of this paper, that he means to retire from the presidency of the Association and there is a general feeling among all who are interested in the Independent movement that there will be a new order of things, that the Association will be pushed along strong, practical lines from the standpoint of the operator. As Judge Thomas himself has said: "The time is here when the National Association needs the leadership of a capable, technical man." It is our opinion that this need of a technical man and an aggressive one has been pressing for some time, and that the affairs of the Association would have been more advanced if such a man had been selected at the last convention held in Philadelphia.

However, that is past and gone, and now that Judge Thomas himself comes out for a change in the control of the association, it may very well be forgotten. This is true particularly in view of the fact that with all its shortcomings the National Association has done a really great piece of work for Independent telephony, and the men who have led it are entitled to full credit for this work. The trouble with them has been simply that they did not know when to let go. They fought to a successful issue the patent cases that hampered the Independents and thereby certainly cleared the road for genuine telephone development. For this the operators should give these men full credit, and they should further give evidence of their interest in the general welfare by attending the forthcoming convention if their business engagements possibly allow. There can be nothing of more importance than a representative gathering at Chicago. The outcome of the deliberations there may mean much to the industry, and the selection of the right sort of a successor to Judge Thomas is a particularly weighty matter at this time, in view of recent developments in the field. There is bound to be a new policy inaugurated, and that this policy should be the right one concerns every man in the business. The Association must have a new purpose. It has accomplished fully its old purpose, the defence of the Bell suits, and now needs to be directed to new channels and infused with new blood. Certain radical changes press for adoption. At present the members of the Association pay yearly dues based on the size of their plant or organization. This should be done away with. All the members should be placed on an equal footing, financial and otherwise. A nominal yearly fee should be fixed for all and the members should have standing simply as individuals, and not as firms or corporations. This would give the strong personal element that is needed to push matters along. And one thing should certainly be done above all others. The new executive officers, whoever they may be, should be empowered to negotiate with the officers of the Interstate Associations with a view to merging the two bodies, making an association that shall take in the entire country and present a solid front against the enemy. All these considerations should make for the attendance at Chicago of every Independent telephone man who has the general welfare at heart.

A VERY INTERESTING APPLICATION

Several party line selective signaling devices have lately been put on the market by the manufacturing companies. The principles of operation of the apparatus have departed widely from the beaten path which has been largely followed in this regard since the plus and minus system as used by the Bell companies was made a commercial possibility. All telephone men know that while the polarized ringer with the biased spring filled in a gap and made selective four-party line service possible it was far from perfect. The sub-station apparatus was too delicate to be given for adjustment to the average man that the telephone company employs. Changes in temperature were often sufficient to vary the tension in the spring enough to interfere with the adjustment of the bell and impair its efficient operation. Beside this there was the bad feature of having a constant ground on the line, which made it more responsive to inductive troubles, to say nothing of the expense and trouble of maintaining a ground and the inconvenience of a bell being rung on the other side of the line when a receiver was removed before the signaling current had ceased to flow. All will admit that the old four-party system was, to say the least, one which required careful handling.

When, with the adoption of the common battery system, it was found necessary to remove the permanent ground at the sub-station and substitute one which could be brought into circuit by means of a relay, the condition was in no wise improved. Instead of the sub-station apparatus being simplified it was made more complicated, and one of the ends sought by the introduction of the central energy system was defeated. A complicated and delicate appliance was placed at the sub-station. The simplicity acquired after so much study and labor was lost.

Branching out on lines that had been forgotten, one inventor has modeled into commercial shape a system which has for its principle of operation that of the old tuned reed. This has long been acknowledged by those who have studied the situation as a principle which, if it could be put into practical shape without undue complications, should be successful. The inventor has made an exhaustive review of what the telephone world is looking for, and with these requirements in mind has gone ahead and perfected his invention. The system has been installed in at least one large exchange. In this none of the undesirable features found in the systems of the past are present. There is no ground at the subscribers' sub-station. There is no delicate spring at the bell to be adjusted. Everything is so simple and straightforward that the success of the system seems promising.

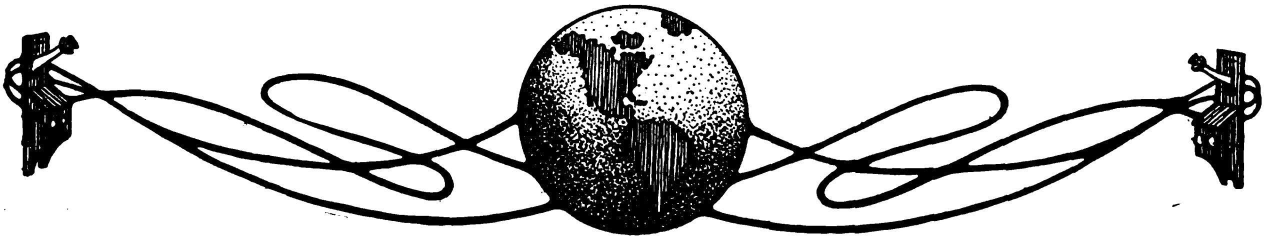
Mr. Dean, the inventor, is not alone an electrician of unquestioned ability but he is also a thorough business man, and is not one who would place any kind of a commodity on the market without feeling confident that it would fulfill its functions.

Telephone men in general have, because of unpleasant experiences, become skeptical in regard to party line selective ringing devices. In view of this the result of the time test of the new apparatus will be watched for with interest by men in the profession the world over.

The extreme simplicity of the invention cannot but appeal to any engineer who has had to deal with the systems of the past. True, the central office apparatus will be more complicated, but good engineering practice has for some time past sanctioned this principle, conceding that it was well worth while to have more elaborate machinery at the central station, where it could be watched by experts, if thereby it was possible to have simpler apparatus at the sub-station.

COMPOSITE CIRCUITS—ARTICLE I.

By Arthur Vaughan Abbott.



Editor's Note.—This is the second article in a series to be published by The American Telephone Journal on the important subject of Simultaneous Telephony and Telegraphy. Others will appear from time to time, and when completed will comprise a complete exposition of the subject.

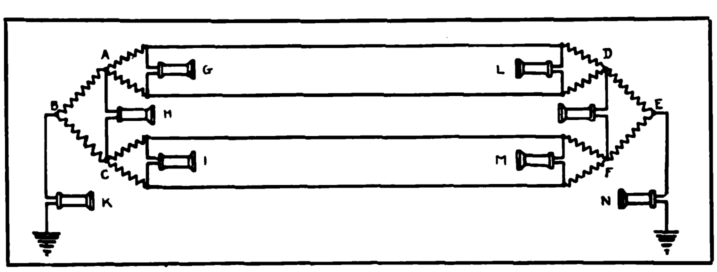


FIG. 1.—A Simple Duplex Circuit.

THE Independent telephone companies are making a strong effort to build up a toll system which shall ramify over all the country and unite both the smallest and the largest exchanges. From the standpoint of the subscriber such a system is of the greatest convenience and eminently desirable. To provide such facilities many telephone companies have invested in toll lines to the verge of bankruptcy, for the toll line plant is usually the lest paying portion of a telephonic investment. It is the most expensive to build, because as it carries few wires the cost per wire mile is high. Maintenance and depreciation charges are larger, for as the lines run through long stretches of open country they are subject to more than ordinary exposure, and the cost of making repairs is high. Then the toll line load factor is low, because the use of the line is chiefly limited to a few business hours each day, and as the operation of a toll line is much slower than that of an exchange line, fewer messages can be handled during the busy hours. This is the true measure of efficiency. To make the toll line pay without exacting a tariff that shall seem entirely disproportionate to service rendered is one of the hardest problems that the local toll line manager has to solve. It has become somewhat customary to allow three minutes as the normal length of a toll line talk, upon which the schedule of rates is based, and if two minutes more is allowed for getting parties, clearing out, delays, etc., and the thousand and one things that absorb time, the average maximum capacity of each toll circuit will be about twelve messages per busy hour. This is really the measure of the toll line, for while by all sorts of artifices, such as reduced rates, greater time allowance, etc., the subscriber is coaxed to use the toll line during the leisure hours, yet the business day is the harvest time of the toll lines, and the manager who can get the most out of his lines will show the best balance sheet, and any device which will increase line capacity will enable the same plant to earn more. The composite circuit, whereby one can telephone and telegraph simultaneously over the same lines, and the various circuits wherewith duplex telephony can be achieved, are all methods by means of which the astute manager can increase at small expense, the capacity and consequently the earning power of his plant. Of course, good judgment must be exercised as to when to composite or duplex. Take the case of a short line of two or three circuits only occasionally overloaded; it is probably better with judicious handling to coax customers along than to invest in any more plant. When the business grows a couple more circuits can probably be added to the same cross-arm with only the expense of wire, insulators and pins. In another instance there may be a long line, on poles already fully loaded, when a new right of way or the reconstruction of the old line to gain additional capacity would be difficult and expensive. In such a case, duplexing and compositing is the thing to be done.

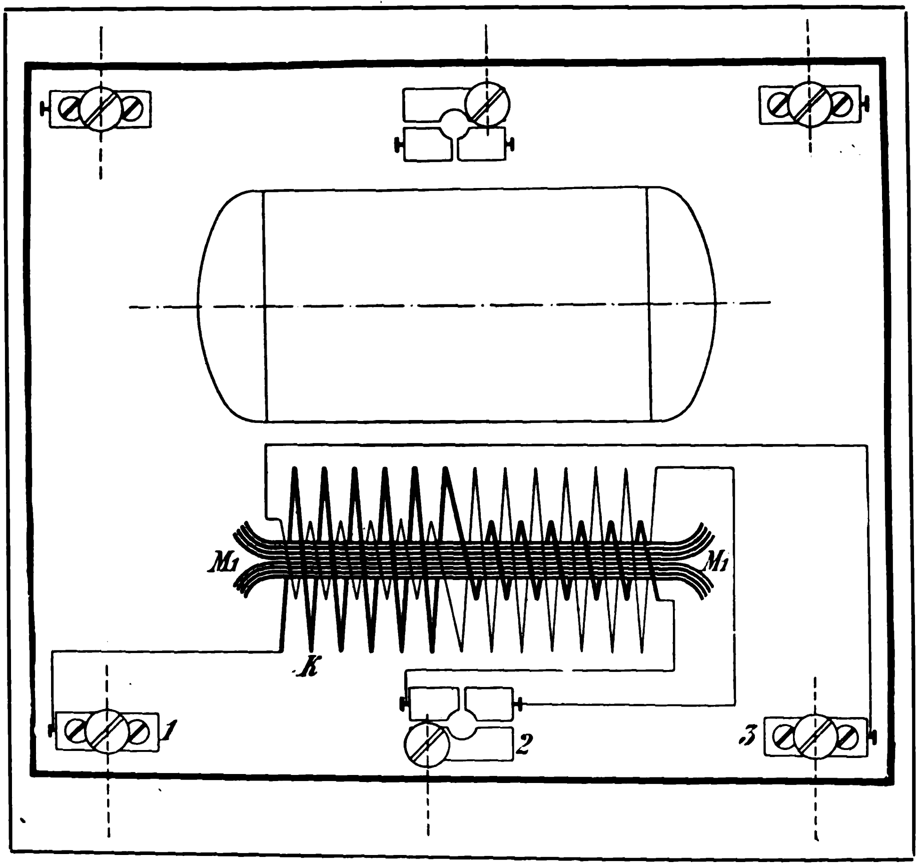


FIG. 3.—The Duplex Coil.

Before passing to the technical consideration of the methods involved a word or two as to what these artifices may accomplish is apropos. The composite circuit is one over which telegraphic and telephonic communications can be simultaneously carried on. It may be said that a telephone company has little reason to enter the telegraphic field, notwithstanding the fact that most telephone companies have embraced the word "Telegraph" in their co-oporate appellation, and that it is better policy to leave this field to possible powerful competition and stick to the legitimate business of telephony pure and simple. But even if the telephone company does not desire to accept telegraph messages, as such, there are several ways of making a composite circuit remunerative other than avowedly starting a rival telegraph company. The circuits may be leased to the existing telegraph company, and telegraphically operated by it. Oftentimes such an arrangement is advantageous, for the telegraph company is usually the older of the two and likely to be short of facilities. The privilege to telegraph over composite circuits may be leased to private parties such as brokers, commission merchants, etc., that in the larger towns create quite a demand for private wires.

It has become quite common for people, especially travelers and those in the smaller towns and cities, to make appointments for toll talks. This business is usually transacted as follows: Mr. Smith goes to the telephone office and tells the toll clerk to call up the ——— hotel in Jonesville and leave word for Mr. Brown to be at the long distance telephone in the hotel at 2 p. m., or else Smith asks the toll clerk to have the office in Jonesville send a messenger boy and bring Brown to the telephone. Now either the telephone company must make the appointment over its own lines by telephone, which if it be short of facilities is just so much loss of efficiency, or it must go to the telegraph company and send a messenger like any other customer. By compositing its lines, the telephone company can do all work of this kind and indeed transact much internecine business without interrupting for a moment the regular commercial use of its toll circuits. Such are a few of the ways a composite circuit by provided telegraph facilities may add to revenue derivable from toll plant.

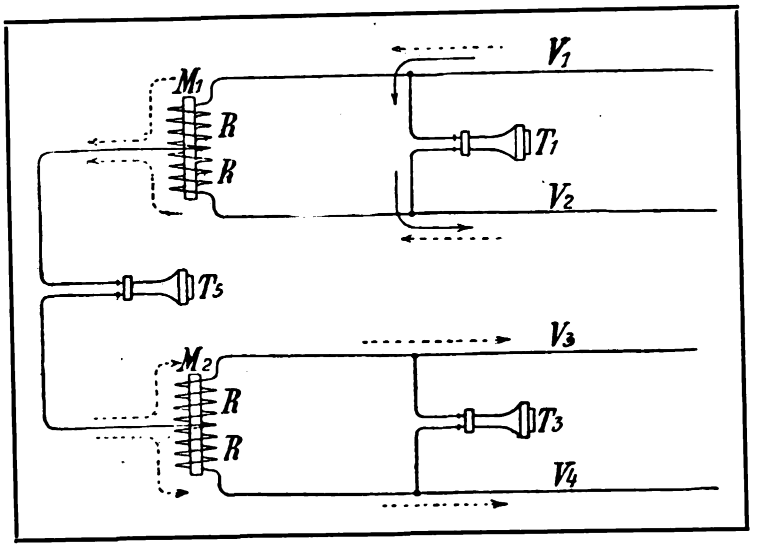


FIG. 2.—*A Metallic Duplex Line.*

The term duplex when applied to telephone circuits is usually understood to mean such an arrangement as will permit of simultaneously carrying on more conversations than there are separate wire circuits. Thus with two circuits three conversations may be easily managed, and four are possible, with three circuits five are perfectly feasible and eight are theoretically possible. By this means the actual capacity of any plant to handle messages telephonically is increased, and all questions of interference with other organizations are avoided, and from this point of view it is the preferable method to adopt. But in some cases there may be a demand for telegraph facilities, and none for additional telephone capacity.

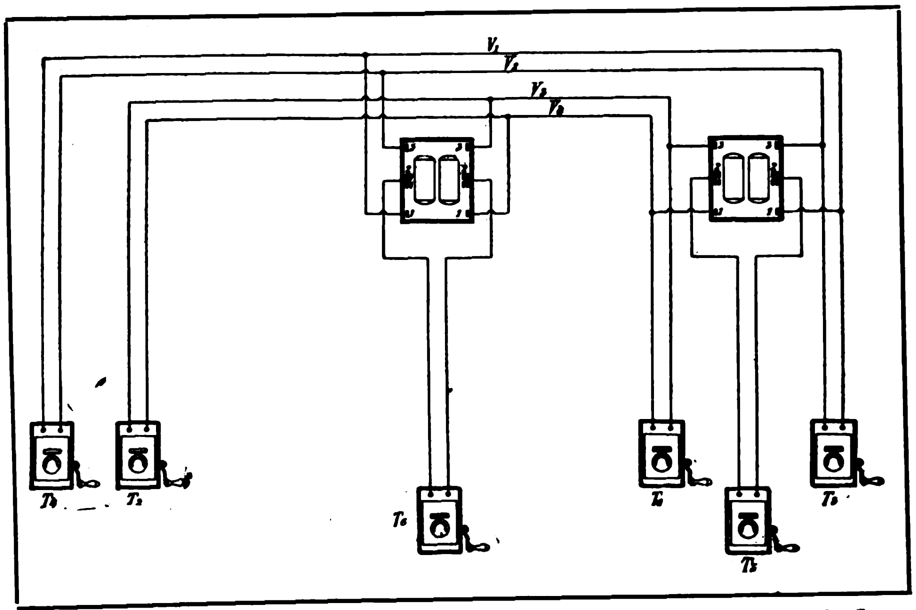


FIG. 4.—*Duplex Line with Three Stations at One End, Two at the Other, and One in the Centre.*

The simplest method of duplexing a telephone circuit is shown in Fig. 1. Here A' C' and B' D' are the two wires of the ordinary metallic telephone line with the telephones at E and G. This circuit may be equipped with transmitters, ringers and all the apparatus commonly used, the only precaution necessary is to have both sides of the circuit perfectly balanced; that is, the resistance, inductance and capacity of A' C' and B' B' must be exactly the same. This condition must prevail whether the telephones E and G are or are not engaged in conversation. Between the points A' and F, B' and F, also between C' and F' and D' and F', coils are placed in such a manner as to make the parallelogram F A' C' F' D' B' a Wheatstone Bridge. The coils A B C and D should be wound non-inductively but should have considerable resistance, the amount depending on the resistance of the rest of the circuit. At the points F and F' telephone instruments are attached and grounded. This provides two independent and distinct telephonic circuits, one a metallic circuit, using the line circuit A' C' D' B', the other a grounded circuit using the two wires A' C' and B' D' in parallel, and the ground as a return. A consideration will show that if carefully built the telephones at E and G cannot hear the faintest sound produced in the telephones H and F'', because the points A', B' and C', D' are at exactly the same potential and the rest of the circuit is balanced. The telephones at F'' and H may be furnished with any of the ordinary appliances for ringing.

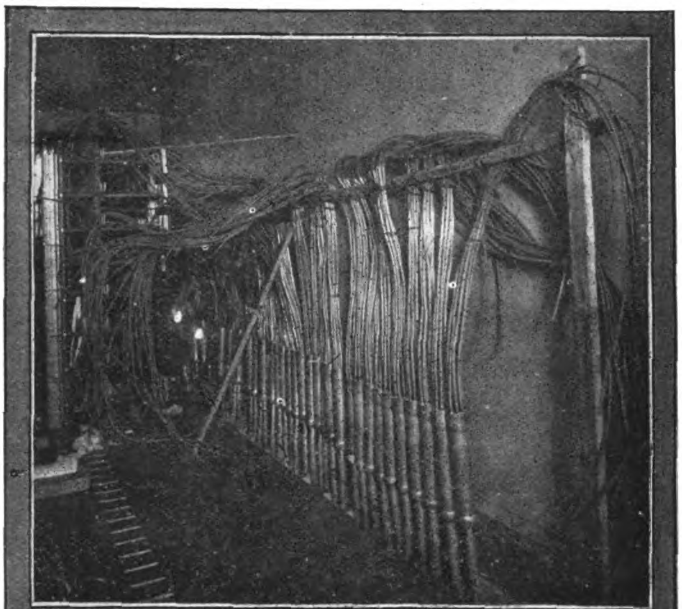
Examining the metallic circuit it will be seen that telephonic currents have three paths over which they can travel: 1st. Currents starting from telephone E can travel through the coils A and B and the telephone E, thus simply circulating round and round without traversing the line. 2nd. Currents from the telephone E can traverse the line A' C' D' and B', passing through the telephone G and reproducing conversation at this point. 3rd. Currents from E may pass through the line A' C', thence through the coils C and D and return through the other half of the line B' D' without passing through G. By winding the coils A B C and D differentially, it is evident that current impulses from H and F'' will split at points F and F', and if the coils A and B, C and D are balanced an equal amount of current will pass from each side. Then the coils will not offer great impedance to the currents from F'' and H, but will only present the ohmic resistance due to the amount of wire which they contain, and this is not a serious obstacle to telephonic conversation. Exactly the reverse takes place when impulses are originated in E and G, because currents from E that endeavor to flow through A and B must pass through the entire windings of both coils in series and are opposed by the total impedance of this coil. By this means the losses due to A and B and C and D are rendered comparatively small so far as the working of the circuit A' C' D' and B' is concerned.

Those who believe that grounded lines are radically unsatisfactory and should never be operated will have good reason to criticize such method of operating a telephone circuit. If properly balanced the metallic circuit A' C' D' and B' will not suffer any inconvenience from the grounds at F'' and H, and so far as the use of this circuit is concerned, the duplexing apparatus does not in the slightest impair its usefulness. It is, however, essential that the metallic circuit should be maintained in the highest state of insulation, for if any grounds are permitted, it at once becomes unbalanced and the most serious cross-talk will immediately ensue. There are many cases, particularly in the smaller exchanges, where the owners believe that grounded lines are sufficient for the business which they wish to transact, and the users are, or at least seem to be, satisfied with the service which such lines render. Under such circumstances the circuit shown in Fig. 1 would render service which would be satisfactory according to such ideas, and where no electric railways exist and other electrical disturbances are infinitesimal, the circuit will give fair satisfaction even if a grounded circuit be considered hardly satisfactory to offer to subscribers, the plan in Fig. 1 can be used by the telephone company to advantage for making appointments, and obtain other exchange work where existing conditions will permit.

The ingenious electrician will at once perceive that it is easy to extend the method shown in Fig. 1 and with two pairs of wires to construct three metallic circuits. One end of such a line is shown in Fig. 2. Here the stations T_1 and T_3 use the wires V_1 V_2 V_3 and V_4, and with a corresponding instrument at the other end, form each a complete metallic pair. Beyond the stations T_1 and T_3 the lines are extended and differential coils M_1 and M_2 connect with the ends of each wire. From the center of these coils a circuit is extended through the telephone station T_3. In all other respects this circuit is exactly similar to the one shown in Fig. 1, but here it is evident that three completely metallic circuits are produced, and under such an arrangement all criticism arising from the telephonic use of the ground is avoided. To construct such a circuit great care must be exercised in building of coils M_1 and M_2. A diagrammatic representation of the winding of the coils M_1 and M_2 is shown in Fig. 3. The line wire V_1 enters at the binding post 1 and passes through the heavy winding K, which, over half the coil, is wound on the outside; it then passes through the other half of the coil wound on the inside, and thence to the binding post 2, and back to the coil, first on the outside of one-half of the coil and then through the inside of the other half to binding post 3 and thence to the line wire V_2.

The metallic lines V_1 and V_2 enter the binding posts 1 and 3 on the first coil, while the line from T_3 is connected to posts 2 and 2 of the first and second coils. All the coils must be wound with precisely the same number of layers and turns per layer and the resistance carefully balanced with a non-inductive resistance, then results which are entirely satisfactory can be obtained. There are three arrangements of stations which are possible upon a duplex line of this description. First, all stations may be at approximately the extreme ends of the line. Second, three stations may be at one end, two at the other end and one at the middle, and third, the three stations may be respectively at the end of the line and one or more stations bridged off between the terminals. Another circuit combination is shown in Fig. 4, which is sufficiently self-evident to render a description unnecessary.

Fig. 1.
General View of Pot Heads.



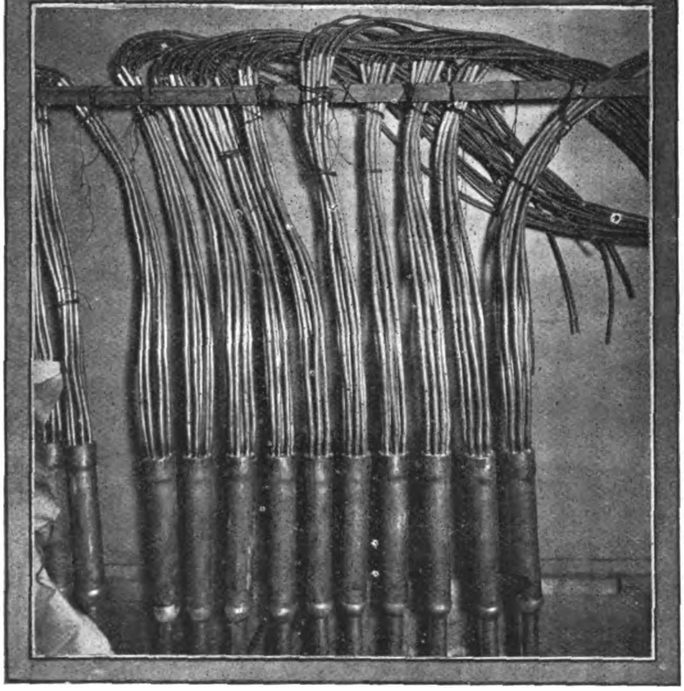


Fig. 2.
Front View of Pot Heads.

FINE MODERN CABLE ENTRANCE

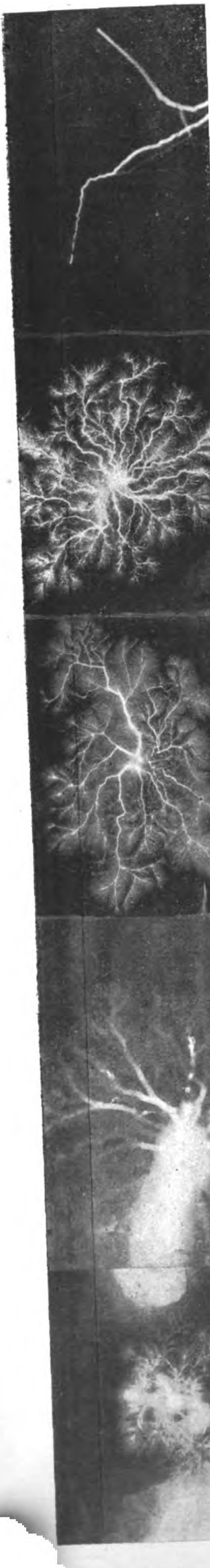
The Illinois Telephone & Telegraph Company have proceeded with the work of equipping the city of Chicago with Independent telephones so far as to complete the cable entrance from the tunnels beneath the city streets into their first exchange—181 Fifth avenue. The main cables to serve this exchange consist of fifty 200-pair paper cables. From all parts of the district they converge towards the building at 181 Fifth avenue and are brought into the basement and thence turn and run upward to the switchboard floor, alongside of the wall of the building through a slot, which is cut in the several floors intersected by the cables. Fig. 1 shows the general method that has been adopted for bringing the cables upward from the cellar to the room in which the distributing boards are located. When the cables arrive at the distributing room they are terminated and supported in the slot. The terminal consists of a lead sleeve which forms the covering for a pot head. To the paper covered conductors of the main cable a series of eight 25-pair leaded switchboard cables are spliced. These cables enter the pot head and are hermetically sealed to the top of the lead sleeve. From the pot head these cables will ultimately pass to an iron rack, to be supported against the sides with arms. In the illustrations 1 and 2 this rack is not shown, as it is not yet in place, but the cables are temporarily supported by means of a wooden scaffold.

GOOD ENGINEERING EXAMPLE

From the pot head the switchboard cables pass to the vertical lines of the main distributing board, as is shown in Fig. 1. They are then fanned out end, two at the other end and in the usual manner. Fig. 2 is a front elevation of the end of the cable run, which is shown in Fig. 1, and gives an exceedingly good illustration of the modern method of terminating underground paper cables and distributing their conductors to the main frame. In order to make the joint between the switchboard cables and the sleeve of the main cable perfectly waterproof, a wooden block is prepared containing eight holes, which is slipped over the switchboard cable and inside to the top of the lead sheath. The sheath is then drawn as closely as possible in contact with the wooden block, and tin lead composition, practically a high grade of solder composed of about 80 per cent. tin and 20 per cent. lead, is poured in on top of the block and heated sufficiently to make a white joint, both with the lead sleeve and with each of the switchboard cables. The cable installation that the Illinois Telephone & Telegraph Company has secured has been made by W. H. Crumb & Co., who are to be congratulated upon doing such an excellent piece of work.

This installation is unique in a way, as but few similar to it have been put in in this country. Companies contemplating work of this kind will find it a good model.

Specifications for the Maintenance and Care of Protective Apparatus



By William H. Hyde.

Editor's Note.—*This is the first of a series of articles on protective apparatus to be printed by* The American Telephone Journal *during the next few months. The series will be the first complete exposition of this important branch of telephony ever published. It will cover ground in which every operator is vitally interested. At its close the readers of this paper ought to be in a position to put into practice the best ideas for protection now available in the electrical world.*

FOR country exchange managers and wire chiefs the following specific instructions are given for the maintenance of protective apparatus:

THE TUBULAR FUSE.

The tubular fuse consists of a fuse enclosed in an asbestos tube, inside of a red fibre tube, equipped with terminals.

The fuse is intended to protect the open space cut-out, or carbon protectors, the sneak-current arrester and the wire between fuse and the ground against crosses with high potential currents, such as lightning discharges, trolley, electric light currents, etc.

Use only standard tubular fuse furnished for this protector.

Permit no inflammable material (paper, curtains, etc.) to be placed or hung on this protector.

If the fuses are mounted on porcelain bases, take care that the transverse slits in the tube are turned toward the wall.

If the fuses are mounted horizontally and stand out at right angles to the wall, they should have a clear space of at least six inches beyond the open end of the tube.

OPEN SPACE CUT-OUT.

This protector consists of a line spring and ground plate, between which two carbons (one carbon containing ball of fuse metal in the centre) are placed, separated by a U-shaped piece of mica.

The object of this device is to operate in case of lightning discharges and crosses with lightning or power circuits in which the current is distributed at a pressure of over 350 volts.

Providing the mica separator is of the proper thickness, it permits, in case of lightning discharges, crosses with lightning, trolley or other power circuits, the current to pass to earth without going through the switchboard or other apparatus; while in case of continued crosses with electric light or trolley wire, the current passing between the two carbon plates will melt the ball of fuse metal, which will permanently connect the line with the ground. If there is a dangerous current on the crossed line, the fuse protector will immediately operate, thus preventing current from overheating the carbons or sneak-current protectors or injuring the wire between fuse and ground.

The requirements for this arrester are that it shall not be operated by generator currents, but shall respond to currents of over 350 volts pressure, such as trolley, arc light or power circuits.

The sensitiveness of the device depends upon the separation of the carbons. If the mica separator is too thick, the sensitiveness will be reduced, and the arrester will not protect against crosses with lightning or power circuits, though it may still remain operative in case of lightning discharges.

The mica should be placed between the carbons with the open portion directed downward, in order that the dust may not collect between the plates.

Have nothing between the carbon plates but the U-shaped mica furnished as a separator.

Never use more than *one* mica separator between carbons.

Never use paper or any other material between carbons.

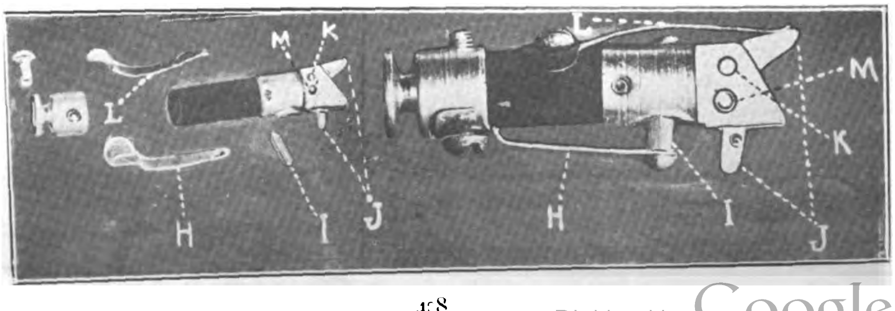
The chief function of the arrester is lost when thicker separator is used than specified above.

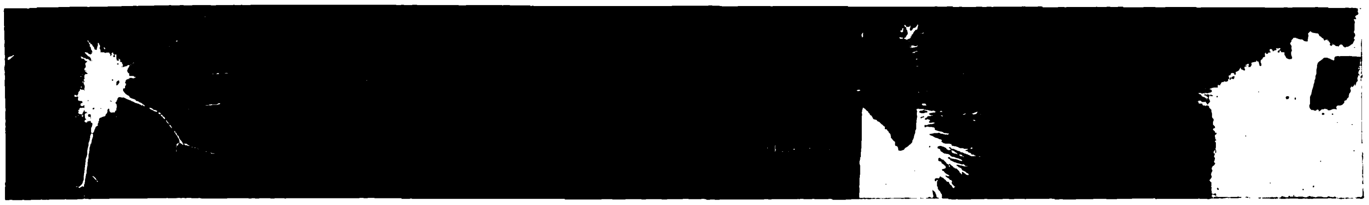
Have the ground plate of the arrester connected by means of a copper conductor of a carrying capacity of not less than three strands of No. 12 B. & S., with a good permanent ground-water pipe preferred.

SNEAK-CURRENT ARRESTER.

This device consists of a coil of German silver wire on a conducting shell, surrounding a metallic pin, to which it is soldered with a low-melting alloy, and is intended to protect against currents of less than 350 volts pressure, which would be too low to operate the

FIG. 3.—Two Views of Self-Restoring Heat Cartridge.





open-space cut-out or fuse, but great enough to be dangerous to the drops, ringer-coils and other apparatus.

This arrester operates to permanently ground the line in case of a continued cross with an electric light or other wire with a current sufficient to heat the apparatus to be protected.

The sneak-current arrester should be placed in the circuit between the carbon-plate arrester and the switchboard.

Before placing the heat coil in service test each pin, to be assured that it is firmly soldered to the shell.

After an arrester has operated, replace it with a new one.

Heat coils should measure 27 or 43 ohms each.

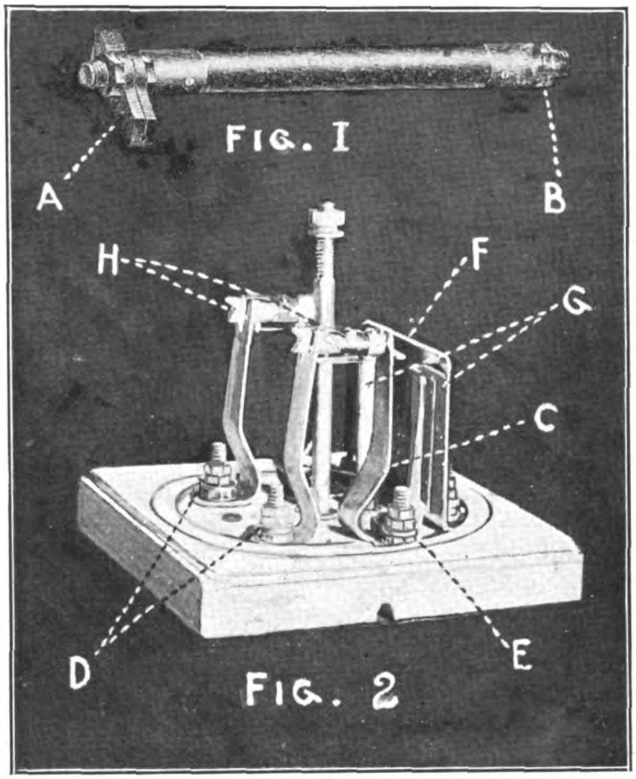
Do not attempt to repair heat coils, as their effectiveness is destroyed if not repaired with the special alloy made for the purpose.

Have the ground plate of arrester connected by means of at least three strands of No. 12 B. & S. copper wire, with good, permanent ground.

Fig. 1 shows a type of enclosed line fuse. It is attached to the drop by the clamp *A* while the wires that go to the telephone are fastened under the lock nuts at *B*. Enclosed in the tube which is made of fibre is the fuse proper, which is surrounded by powdered asbestos.

Fig. 2 is a type of protector with glass cover removed. The line springs are shown at *C*. Wires go from the binding posts *D D* to the instrument. The line wires connect at *E E*. *F* is the ground plate from which a wire is taken to earth. *G G* are the carbon arrester blocks and *H H* are heat cartridges.

Two heat cartridges are shown in Fig. 3, that on the left being intact and the one on the right dissected. This type of cartridge is termed self-restoring, because after releasing on account of an excessive current, it assumes its original condition, and can be used over again almost an indefinite number of times. Its action is as follows: When placed in the protector as shown in Fig. 2, any current passing over the line will pass through the cartridge, by way of the spring *H*, small carbon cylinder *I*, metal lever *J* (which is pivoted at *K*), and to the instrument by way of the long protector spring *C*. Any current greater than the cartridge is designed to stand, in passing through the carbon will over-heat it, which heat after a time will be transmitted to lever *J*. A solder which has a very low fusing temperature fills the hole *M* and holds *J* in the position shown. When the heat comes from the hot carbon the solder is melted and the lever *J* lets go, turning on its pivot *K*. This opens the line. The spring *L* restores *J* to its original position and after the solder has cooled, the apparatus is ready to again perform its function.



Line Fuse and One Type of Protector.

ODDS AND ENDS OF TELEPHONY

MANY funny things happen over the telephone every day. Since they first came into use the telephone and the "hello girl," as telephone operators are usually designated by the lay press, have been the butt for criticisms and witticisms of the editors. But nevertheless there are many strange and laughable incidents in connection with the telephone, such as, for instance, the man who placed the receiver to his lips and the transmitter to his ear. As his ears were not built for articulation and his mouth not for audition, his first telephoning didn't meet with distinct success, and when he walked from the telephone booth his disappointment in the wonderful little instrument was plainly visible.

Another incident happened in a rural community in Kansas, which had just been provided with telephones. A lady called up the local hardware dealer and asked him if he had any turpentine, as she wished to mix some paint. He left the receiver off the hook and went after the turpentine bottle. Returning with it he held it up in front of the telephone and said: "You see how much I have. Is this enough?"

It seems that until the people there got on to the telephone, there were a lot of mix ups. An old gentleman, while talking to a friend one day, nodded his head instead of saying "Yes" and "No," and when his friend asked him what he was saying he was highly indignant.

An Indianapolis, Ind., milliner has brought suit for $10,000 damages against the Central Union (Bell) Telephone Company. One of its linemen was stringing wires on the ceiling of the room in which the milliner was working. Slipping from his ladder he fell upon the milliner "negligently and carelessly," according to the legal wording of the bill of complaint.

One dark night recently thieves visited the office of the A.

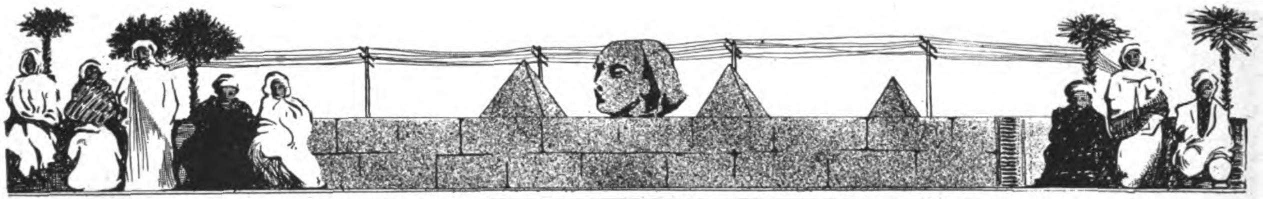
SOME QUEER NEWS NOTES

C. Kies Lumber Company, of Indianapolis. They carried off, as their sole plunder, the Bell telephone. The instrument belonging to the New Telephone Company was considerately left in position.

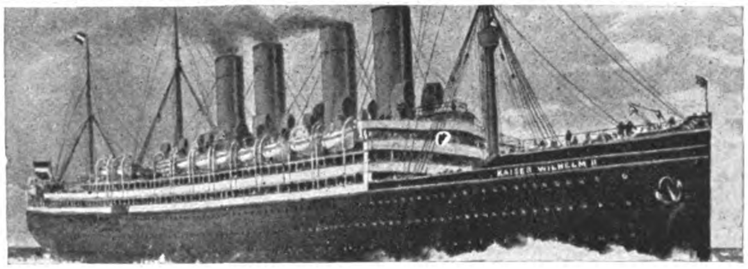
L. A. Goudy, the hustling general manager of the Northeastern Telephone Company, who is constructing a system in Portland, Me., while excavating for the foundation of the new exchange building came upon a vein of gold. The local newspapers, in commenting upon the "find," say: "It would be funny if General Manager Goudy should find that he has a gold mine under his new telephone exchange building. That would indeed be starting in on a bed rock basis. A vein, three feet wide, has been found there, however." Mr. Goudy has taken steps to discover just what he has found.

An idea of the perversity of some of the little towns in which the Independents have installed telephones and which under the Bell regime would never have had telephone service, is furnished by Nashville, Ind. The Morgantown Telephone Company about a year ago installed a system in Nashville, with about 50 telephones. Because the company would not give free service to Columbus a town meeting was held recently and word was sent to the telephone manager to take out all the telephones. The town is now without any service.

The Bell manager at Shelbyville, Ind., is in trouble with his force. This manager had the windows of the operating room frosted, so that the girls could not look out. They resented the frosting and demanded that it be removed. The manager refused and the girls in a body vacated their switchboard positions. One boy in sympathy also struck. Later the manager discharged a lineman because he refused to serve at the switchboard, and two other linemen who were at the board struck in sympathy with him.

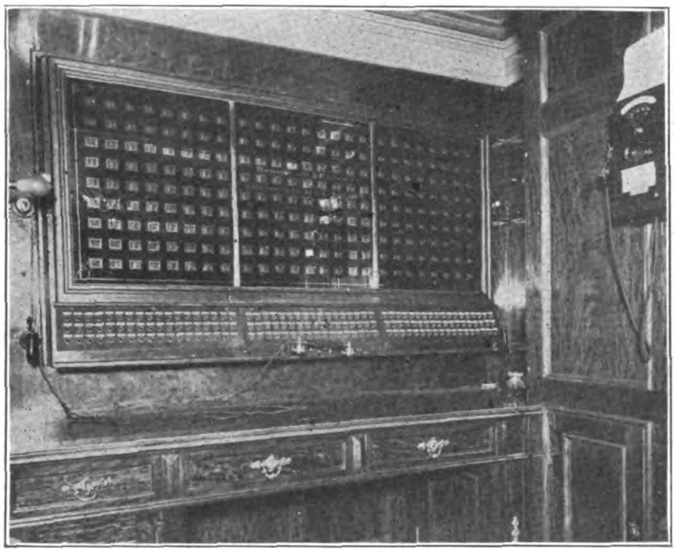


A Telephone System On the Ocean



The Exchange On the Kaiser Wilhelm

ON large steamships, many of which average three city blocks in length, it has been estimated that a steward in answering calls and filling orders will walk something like 15 miles a day. If the order can be given him by telephone, only half this distance will be traveled, and a corresponding amount of time and energy will be saved. Realizing this, the North German Lloyd Steamship Company has installed in its new steamship Kaiser Wilhelm II., a telephone system, arranging for a possible station in every state room.



The Switchboard on the Kaiser Wilhelm.

The system is operated in conjunction with the call bell service, the same wires being used for both. The annunciator belonging to the call bell system is located in the chief steward's office and is divided into halves, one of which is shown in the photograph. The other half, which is exactly similar, is located on the opposite side of the steward's office, which separates them. One of these annunciators is used for one-half of the steamer, and the other for the other half.

The push buttons in each of the staterooms which operate the annunciator are similar to the ordinary push button, except that in their tops is a concealed jack, into which a plug connected by flexible cord to the combination hand telephone set used may be inserted. In the photograph, hanging on the annunciator, is shown one of the hand telephone sets. The push buttons in the state rooms are used for calling; one ring of the annunciator bell meaning that a steward is wanted; two rings that a stewardess is wanted, and three rings that a passenger wishes to speak with the steward over the telephone. The falling of the annunciator drop indicates which station is calling. When a telephone connection is desired, the annunciator talking set may be connected to the calling station by the insertion of a plug into the jack corresponding to the annunciator drop number. This gives the attendant at the annunciator telephonic connection with the passenger. The jacks are located below the annunciator drops, the whole arrangement being clearly shown in the photograph. The handles and chains at either end of the switchboard are used for restoring a fallen drop.

Ordinarily only a few of the first cabin staterooms are provided with telephone sets, but all of them have the combination push buttons, which are located close by the berth, so that a steward may be called without the passenger having to change his position.

The equipment is of German manufacture, and is remarkably "loud speaking." It will be noticed that the transmitter is talked past, instead of into, the mouthpiece of the transmitter being placed parallel to the ear-piece of the receiver. Practically no difference in audition can be noticed at the far end whether the transmitter be held in front of the head or back of it.

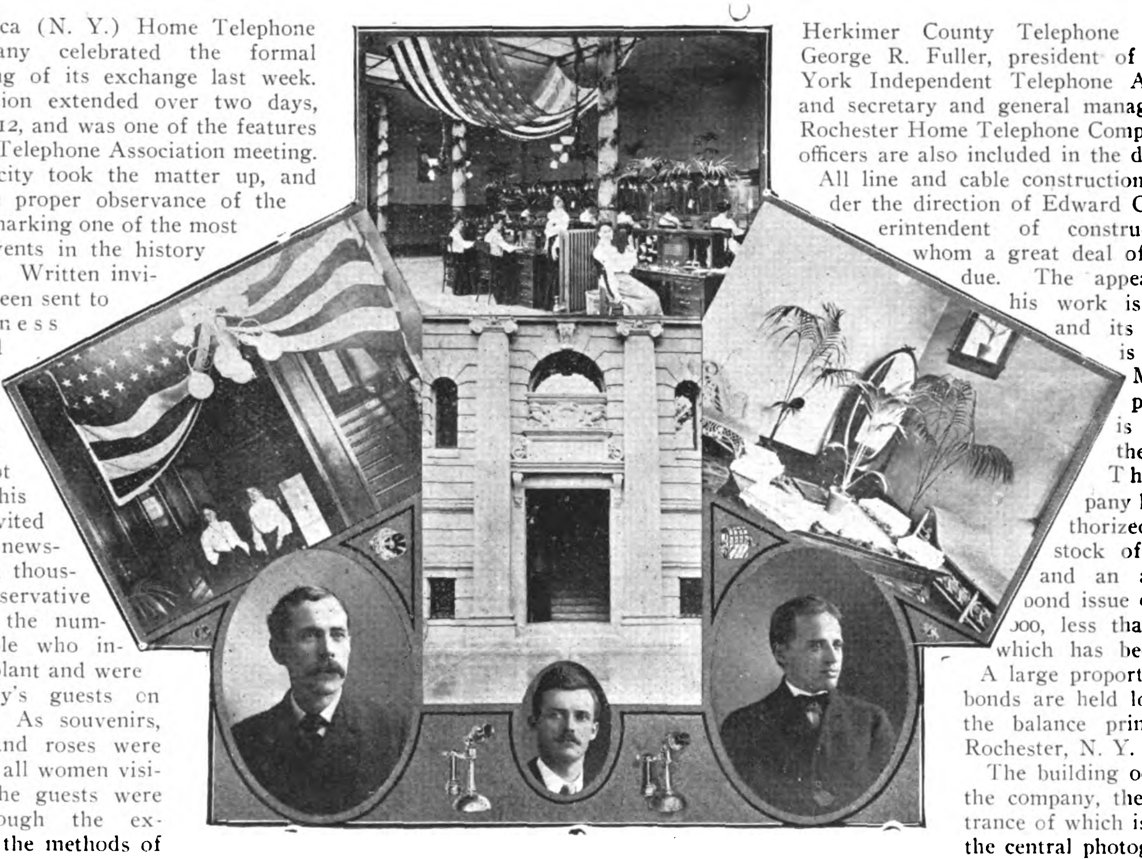
In addition to the state room apparatus, there are intercommunicating systems on the boat. One of these, a station of which is shown on the wall to the right of the figure, is used by the steward to talk to the kitchen or cafe. There is also a system for the captain's use over which orders can be given to the engineer or any of the other subordinate officers. Many other large steamships also have telephone systems.

A Successful New York State Company

GEORGE G. OTIS, secretary and general manager of the Colonial Telephone Company of Newburgh, N. Y., says splendid progress has been made since the company's organization about a year ago. This company is giving a service to the public that is satisfactory in the full sense of the word and which speaks well for its successful future, says the *Mercantile and Financial Times.* It now has over 477 subscribers among the prominent business establishments and residents of Newburgh and vicinity, and this list is increasing day by day. The Colonial Telephone Company connects over the lines of the Warwick Valley Telephone Company, of Warwick, N. Y.; Highland Telephone Company, of Highland Mills, N. Y.; Southern New York Toll Company, Dutchess County Telephone Company, of Poughkeepsie; Citizens' Standard Telephone Company, of Kingston, N. Y.; Farmers' Union Company, of Sussex, N. J.; Sussex Telephone Company, of Newton, N. J., and with about seventy-five cities and towns. Its special claim for patronage lies in the fact of the acknowledged superior service it offers, and which is recognized, because it has reduced the cost of telephone service nearly one half, while the prices are uniform, not temporary, and as the very character of the men identified with the enterprise is a proof that it was an investment made necessary, as it was required by the people. The following is a list of the officers and directors: President, S. V. Schoonmaker; vice-president, W. G. Taggart; treasurer, H. A. Bartlett; S. V. Schoonmaker, W. G. Taggart, H. A. Bartlett, C. D. Robinson, W. H. Coldwell, F. W. Wenzel, H. B. Odell, George G. Otis, Judson Lawson.

FORMAL OPENING OF THE UTICA COMPANY'S TELEPHONE EXCHANGE

By Terrell W. Croft.



THE Utica (N. Y.) Home Telephone Company celebrated the formal opening of its exchange last week. The celebration extended over two days, June 11 and 12, and was one of the features of the State Telephone Association meeting. The whole city took the matter up, and aided in the proper observance of the occasion as marking one of the most important events in the history of the place. Written invitations had been sent to every business house and most of the households in the city, and those who were not reached in this way were invited through the newspapers. Ten thousand is a conservative estimate of the number of people who inspected the plant and were the company's guests on these days. As souvenirs, carnations and roses were presented to all women visitors. All the guests were shown through the exchange and the methods of its operation were explained by those who were in attendance.

The Bell Telephone Company has long maintained a plant in Utica, but the service was arbitrary, and the rates were high. T. Harvey Ferris, an energetic attorney of Utica, realizing the benefits to be derived from an efficient system, and foreseeing a good business investment, determined to build a telephone system. He succeeded in interesting in the project two other citizens, Chas. H. Poole and G. Agne, president of A. D. Mathers & Co.'s Bank. These gentlemen organized a company and secured a franchise. The company then let a contract for the construction of the plant to the Central Construction Company, of Wauseon, Ohio, who sub-let the switchboard contract to the Stromberg-Carlson Company, of Rochester, New York. The construction work was started May 12, 1902, and the exchange was opened for business April 1, 1903, with 1,300 subscribers.

Control of the company's affairs is in the hands of the following gentlemen: President, Edgar B. Odell, of the firm of John A. Roberts Co.; vice-president, Henry F. Miller, of Miller & Son, coal merchants; secretary and general manager, Chas. H. Poole, whose photograph appears on the left; attorney, T. Harvey Ferris, whose photograph is shown on the right; treasurer, Edward Bushing, cashier of A. D. Mather & Son's Bank. The board of directors consists of Jas. S. Brailey and Edward L. Barber, of the Central Construction Company; W. I. Taber, cashier of the Herkimer National Bank and treasurer of the Herkimer County Telephone Company; George R. Fuller, president of the New York Independent Telephone Association and secretary and general manager of the Rochester Home Telephone Company. The officers are also included in the directorate.

All line and cable construction was under the direction of Edward Cline, superintendent of construction, to whom a great deal of credit is due. The appearance of his work is excellent and its operation is faultless. Mr. Cline's photograph is shown in the center. The company has an authorized capital stock of $500,000, and an authorized bond issue of $1,000,000, less than half of which has been issued. A large proportion of the bonds are held locally, and the balance principally in Rochester, N. Y.

The building occupied by the company, the main entrance of which is shown in the central photograph, was built especially for the purpose. It is unusually well adapted to its service. It is finished in white fire brick and white stone. The interior finish is of quartered sawed oak. The fixtures in the main office are of lemon finished brass and quartered oak. A view of the main hallway is shown in the photograph to the left. The operating room is roomy and very well lighted. It is the subject of the upper central photograph.

The switchboard is of the standard Stromberg-Carlson full multiple lamp signal type, having a present capacity of 2,400 lines. All exposed parts are of piano polished golden oak. There are 10 sections of 3 positions each. The first section is used as a toll board. A chief operator's desk and a 3-position information desk are included in the switchboard equipment.

The power equipment is standard and includes all the necessary apparatus for the efficient operation of the plant. A complete system of multiple cable distribution is employed. Line construction received special attention and the line installation is a model one. Toll connections over the company's telephones can be had as far north as the St. Lawrence river, as far south as Binghamton, N. Y., as far east as St. Johnsville, and as far west as Syracuse.

The maintenance of the plant has required little attention from its officers. To date the troubles have averaged about ten cases per week, which, when the size of the plant is considered, reflects great credit both upon the makers of the switchboard apparatus and upon the superintendent of construction.

Some Interesting Telephone Facts about Utica

Incorporated	**December 13, 1901.**	**Ultimate Capacity,**	**12,000.**
Franchise Granted	**January 7, 1902**	**Business rate per year**	**$36.00**
Authorized Capital Stock	**$500,000**	**Residence rate per year**	**$22.00**
Authorized Bond Issue	**1,000,000**	**Bell business rate per year**	**$80.00**
Telephones in Operation	**1,800**	**Bell residence rate per year**	**$45.00**

SOME INTERESTING EXPERIMENTS WITH SELENIUM IN TELEPHONY

By William J. Hammer

THE extraordinary property which selenium possesses of varying its electrical resistance on exposure to light is a phenomenon which has been known for a long time; but the commercial applications of this peculiar property possessed by selenium have not been properly appreciated up to the present time.

The Swedish scientist, Berzelius, discovered selenium in 1817, as a by-product from the distillation of sulphuric acid from iron pyrites. It is a non-metallic element, which possesses characteristics similar to phosphorus, sulphur and tellurium. When melted at 212 degrees Centigrade and allowed to cool rapidly, it forms a brown amorphous mass of conchoidal fracture. In this condition it is a high class insulator. It has been said that a small piece of it would represent the resistance of a wire stretched from the earth to the sun. When heated for quite a time at a temperature of 100 degrees Centigrade, selenium becomes a conductor of electricity to a limited degree, this increasing with an increase of current and varying according to the direction. Selenium has neither taste nor smell. It is usually supplied commercially in a vitreous form, is as structureless as glass and resembles black sealing wax.

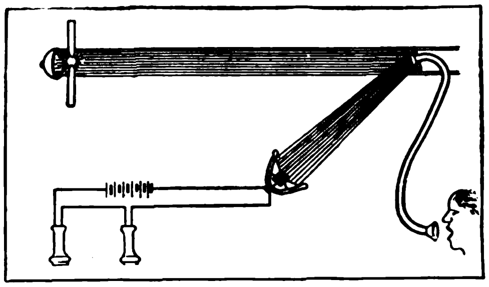
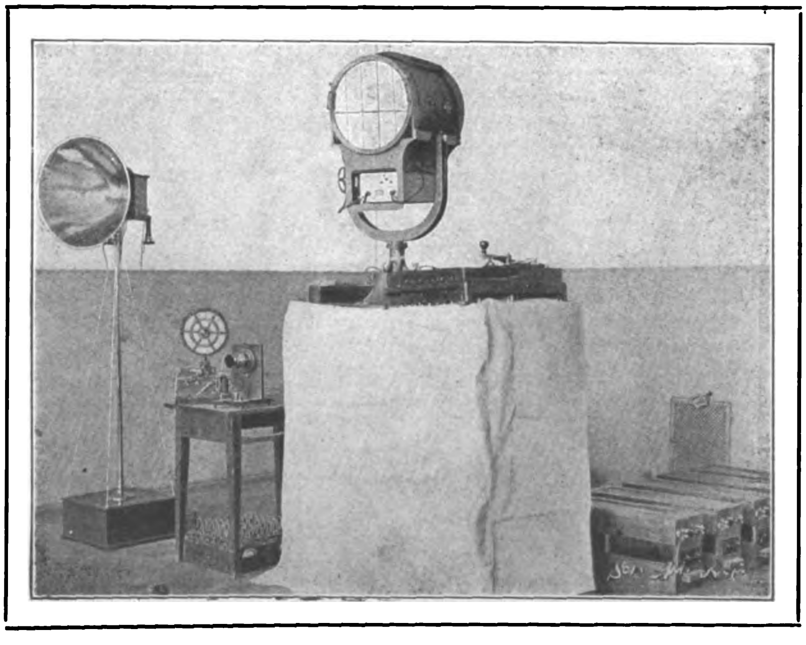


FIG. 1.—Prof. Bell's Radiophone, Showing Beam of Light and Selenium Cell Used in Wireless Transmission.

In order to obtain crystalline selenium, in which form it is useful for selenium cells, it must be kept, as already stated, at from 100 degrees to 200 degrees C. for some time, the black mass being changed into a hard, slate-colored, metallic-looking substance. In this form even the thinnest films are opaque to light, whereas in the vitreous form the film would be transparent and ruby red in color.

In 1851 Hittorf first discovered the effects of temperature on selenium; but it was not until February 12, 1873, that Mr. Willoughby Smith sent a communication to President Latimer Clark, of the Society of Telegraph Engineers of London, calling attention to the effect of light in reducing the resistance of selenium. An assistant of Mr. Willoughby Smith, a Mr. May, who was a telegraph clerk at Valencia, called attention to the fact that some pencils of selenium which had been used to give a high resistance in connection with some of the cable testing work conducted by Mr. Willoughby Smith, showed a marked change in resistance when the sliding cover of the box which held the selenium was removed, and the selenium was exposed to sunlight. These selenium pencils varied in length from 5 to 10 centimeters and were 1 to 1½ millimeters in diameter; they were hermetically sealed in glass tubes with connecting wires of platinum at each end. Little credence was given to the original announcement; and it was only after Earl Ross verified this statement, and proved that the action was due solely to light, and showed the effects of the light of different portions of the spectrum, that it met with serious consideration.

FIG. 2.—Ruhmer's Apparatus for Long Distance Telephony Over a Beam of Light. The Searchlight Is Used as Transmitter and the Apparatus with Reflector as Receiver.



Alexander Graham Bell some twenty years ago made some interesting experiments with his radiophone, a diagram of which is shown in Fig. 1, in which a mica or glass diaphragm covered with a silvered foil was used to reflect a powerful beam of light upon a selenium cell placed in the focus of a silvered reflector. To the selenium cell were connected a pair of telephones and a battery. At the back of the silvered diaphragm was a flexible tube and mouthpiece into which words were spoken. The sound waves causing the diaphragm to vibrate sent pulsations of the reflected light upon the selenium cell, producing corresponding variations in its resistance and reproducing audible sounds in the telephone. Prof. Bell used this only over very short distances.

In 1898 Prof. H. T. Simon, of the University of Erlangen, discovered that an arc lamp, the circuit of which was in proximity to a telephone circuit, was caused to vibrate very perceptibly and he devised his interesting speaking arc by means of which he superimposed the sound waves produced by the telephone upon the circuit in which the arc was placed. He connected the lamp circuit with the secondary winding of an induction coil, the primary circuit being connected with the carbon transmitter, and a battery. The sounds thus produced originally were very weak; but by employing a suitable carbon microphone, the sound was reproduced to large audiences.

Conversely, the arc could also be used in conjunction with telephone receivers to receive sounds.

It is also found that the transmitter battery may be omitted, and a shunt taken from the arc circuit may be used wih the transmitter and a suitable resistance. Again, this resistance may be displaced by storage batteries; and in this case to secure the most satisfactory results, self-induction ("reaction coils") should be placed in the circuit of the arc lamp, allowing the direct current to pass without obstruction; but offering extremely high resistance to the alternating currents produced by the carbon transmitter. By compensating in this way, disadvantage in the use of the shunt is done away with.

The transmitter may also be placed in shunt with the reaction coil instead of in shunt connection with the arc lamp, and this has the advantage that the rheostat used with the storage batteries may be omitted, provided the windings of the reaction coil are suitable for use as a resistance. By this arrangement, the lack of self-induction in the transmitter circuit permits of a very clear and distinct reproduction, sufficient to be heard by large audiences.

Mr. W. Duddell, of England, has made some most successful talking arcs, which the writer had the privilege of seeing in London over two years ago. In his arrangement in the secondary circuit is placed a condenser, which prevents the lamp current entering the induction coil, but allows the induction current in the transmitter circuit to pass without obstruction; and this arrangement has the effect of greatly increasing the sound. By employing a condenser of from three to five microfarads, he compensates for the difference of phase produced by the self-induction in the circuit, thus producing the highest effect in the arc.

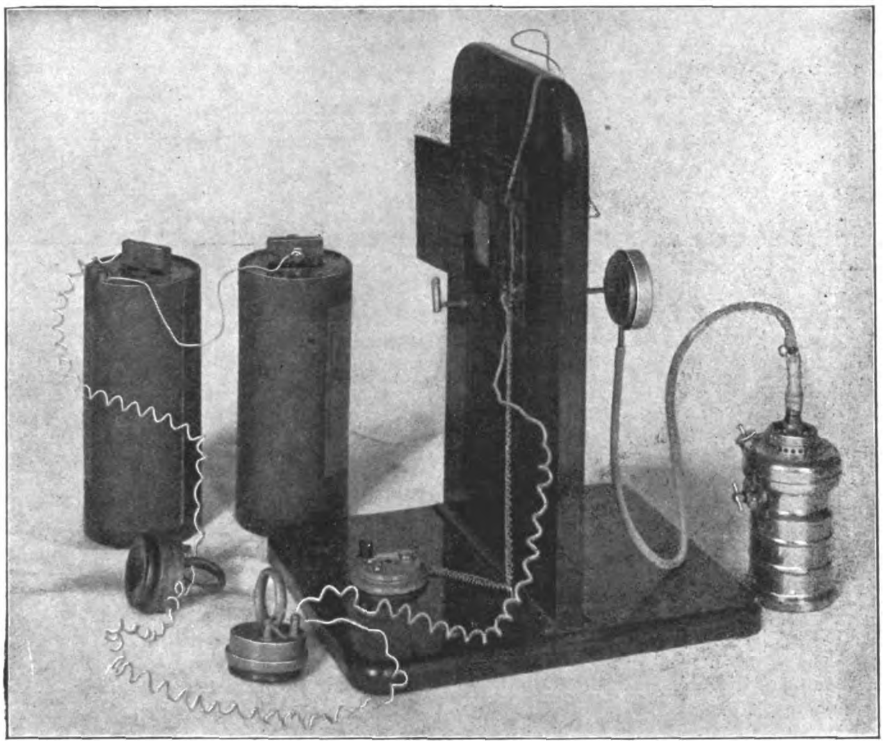


FIG. 4.—Acetylene Flame Transmitter with Selenium Cell. The Transmitter is on the Right of the Partition; the Acetylene Burner on the Left.

When Duddell uses the arc for transmitting sound waves, he employs in the shunt circuit to the arc a condenser and receiving telephone. It is advisable to employ as long an arc as possible It has also been found that the Moore vacuum tube and the various types of mercury arc, such as Arons, Hewitt, and Weintraub, are very suitable for this class of work, as well as the carbon arc; and where the latter is employed, either cored or treated carbons are advisable.

The theory advanced to account for the phenomena of the speaking arc, is that variations in temperature of the arc are produced by the variations of the current, and the change in the Joule effect produces a corresponding variation in the volume of the conductive gases in the arc.

The most successful and most extensive experiments which have been made with the speaking arc are those of Mr. Ernest Ruhmer, of Berlin, Germany, who has employed it in conjunction with his selenium cells for wireless telephony and with remarkable success. Mr. Ruhmer has succeeded in transmitting speech over a beam of light 4¼ miles in length. The apparatus used is illustrated in Fig. 2. In his experiments he employed an arc lamp with a flaring arc 6 to 10 millimeters long, using an E. M. F. of 220 volts, the current varied from 4 to 5 amperes at 1 to 2 kilometers, 8 to 10 amperes for 3 to 4 kilometers, and 12 to 16 amperes for 5 to 7 kilometers, and the resistance of his selenium cell was 120,000 ohms in the dark, this falling to 600 ohms in full sunlight.

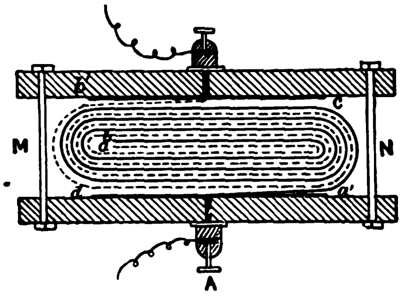


FIG. 3.—Mercadier's Cell. Block and Dotted Lines Represent the Two Ribbons of Brass.

For the transmitting end, Mr. Ruhmer employs a carbon transmitter and a battery superimposing waves on the arc light circuit; and the beam of light is reflected to some distant point, where it is received by a parabolic reflector, in the focus of which is placed a selenium cell connected with a battery and a pair of very sensitive telephone receivers.

Selenium cells may vary in resistance from 2,000 ohms to 500,000 ohms or more in the dark; and certain cells may be five to twenty times as good conductors of electricity in light as in the dark. They are usually made by winding carefully two separate lengths of wire, either of copper, brass, German silver or platinum, equidistant throughout their entire length upon such substances as slate, glass, mica or porcelain. The selenium is then spread thinly over the wires, forming an insulation between the two windings. The method of making the Mercadier cell is to use two narrow ribbons of sheet brass or foil, separated by a ribbon of parchment paper rolled up like a spiral spring. This is held between wooden clamps, one surface being ground and polished off smoothly and a thin layer of selenium being spread over it. An excellent idea of this cell may be had by noting Fig. 3, which shows the standard form.

Selenium cells are very susceptible to moisture, and it is largely this taking up of moisture which produces the electrolytic effect in the cell, enabling one to connect it with a galvanometer and produce a current by merely focusing the light upon the cell. This phenomenon gave rise to the designation of the photo-electric cell.

Prof. Bell has made a nunmber of types of selenium cells, his standard form consisting of alternate disks of brass and mica, with the mica disks slightly smaller than the brass, forming a recess for holding the selenium, which is spread over the surface. All the evenly matched disks are connected to one end of the circuit; and all the odd disks to the other end. The cylindrical form of the cell enables it to be acted upon from all directions, when placed lengthwise in the focus of a parabolic reflector. This is also of great advantage in the Ruhmer type of cell.

Selenium cells possess the remarkable property of recovering the original resistances upon the removal of the source of light.

Fig. 4 is a form of flame telephone consisting of an acetylene generator which conveys gas to the interior of an otherwise empty telephone transmitter. The diaphragm of these transmitters is made of pig-skin, or a similar material. A tiny pipe runs from the back of the transmitter, and ends in a single acetylene jet. By talking against the pig-skin diaphragm the gas inside is made to vibrate and produces a manometric flame. This flame throws its light upon a selenium cell, to which is connected a battery and a pair of very sensitive telephones between 100 and 200 ohms for each cell of battery, in which the sounds spoken into the transmitter are most perfectly reproduced. A thin sheet of paper inserted between the flame and the selenium cell serves to cut off all sound. It is self-evident that these telephone receivers might be at any distant point. I have worked them over considerable distances. The field for scientific research in this direction is promising.

STEPS IN THE EVOLUTION OF CIRCUIT DESIGN

ARTICLE XIII—CORD CIRCUIT; COMMON BATTERY REPEATING COIL SYSTEM

By J. C. Kelsey.

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THE preceding articles have dealt with the answering and calling cords individually, although connected to the same battery. The answering cord is connected to the repeating coil on the tip, or positive side, and to the repeating coil on the ring, or negative side through the relay *AR*. Looking at Fig. 89, we find the sleeve of the plug connected to the negative battery through a lamp, *AL*. As there is twenty-four volts battery in this particular system, it seems fitting to wind the cut-off relay, of equal resistance to the lamp, so that it will divide the voltage of the battery. Supposing one-tenth of an ampere is necessary to heat the filament of a 12-volt lamp, then the hot lamp resistance is about 120 ohms. This would make the resistance of the cut-off relay also 120 ohms, which we will assume to be correct. If the lamp has a hot resistance of 120 ohms, then one-third *R* will be 40 ohms. When the operator inserts the answering plug into the jack of a calling line, the lamp *AL* does not light, because *AR* has become magnetized, owing to the fact that it is in the line of battery supply to the subscriber. *AR*, being energized, pulls up its contacts, bringing the shunt resistances 1-3 *R*, around *AL*, and robbing it of nearly all of its current, which provides a supervising signal.

It is in the calling cord that most of the apparatus is used. It cannot be said that the primary circuit of the transmitter belongs to the calling equipment, yet the secondary part of it does, for the operator has the power of putting her talking set on every pair of cords, and if she chose, could throw all her listening keys, and thirty-six parties could talk to each other, if she had eighteen pairs of cords. Looking at Fig. 89, we find that the only similarity to the answering side is the sleeve connection. The sleeve is connected to battery through a twelve-volt lamp, *CL*, which is lighted upon plugging into a jack of a line wanted, the cut-off relay sharing the average twenty-four volts with the lamp, *CL*. As in the answering cord, when the receiver is off the hook, relay *CR* is energized, being in the path of current to the called subscriber. This causes the relay contacts to close, bringing 1-3 *R* around the lamp, *CL*, and extinguishing it, providing a supervisory signal.

The tip of the calling plug does not connect directly to the positive terminal of the repeating coil. It passes through the contacts of the ringing key, *RK*. Also the ring of the plug has to pass through the contacts of key, *KR*, thence back to the repeating coil terminal through the relay, *CR*. Were it not for such a connection, when the operator rang a party, she would ring back in the waiting party's ear. So when she rings, the hard rubber cylinder shaped piece, directly underneath the cam handle, wedges the two springs, *T* and *R*, and raises them simultaneously against the generator contacts, which allows the ringing current to flow through the subscriber's bell. When she releases the cam handle of the ringing key, the wedge forces the key to normal.

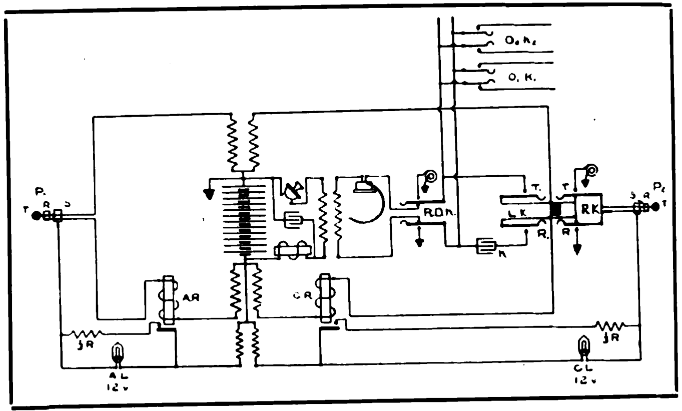


Fig. 89.

The operation of the talking key, *LK*, is different. It does not open any circuit. It only bridges the listening set across the line, so that the operator may talk to either party. The reverse action of the cam handle forces the wedge underneath against springs T^1 and T^2, raising them into contact with the secondary terminals. But in this case, the wedge has proceeded so far as to prevent its recovery, except manually. This is necessary, because the operator may have to write, as well as talk.

The strip of order keys, O^1K^1, O^2K^2, O^3K^3, etc., are connected by a strap, directly to the ring down key, *RDK*. The condenser is placed between spring *R* of ring down key, and contact is made when the listening key is used.

Fig. 90 shows a complete connection between two common battery subscribers. Both telephones are off the hooks, both cord

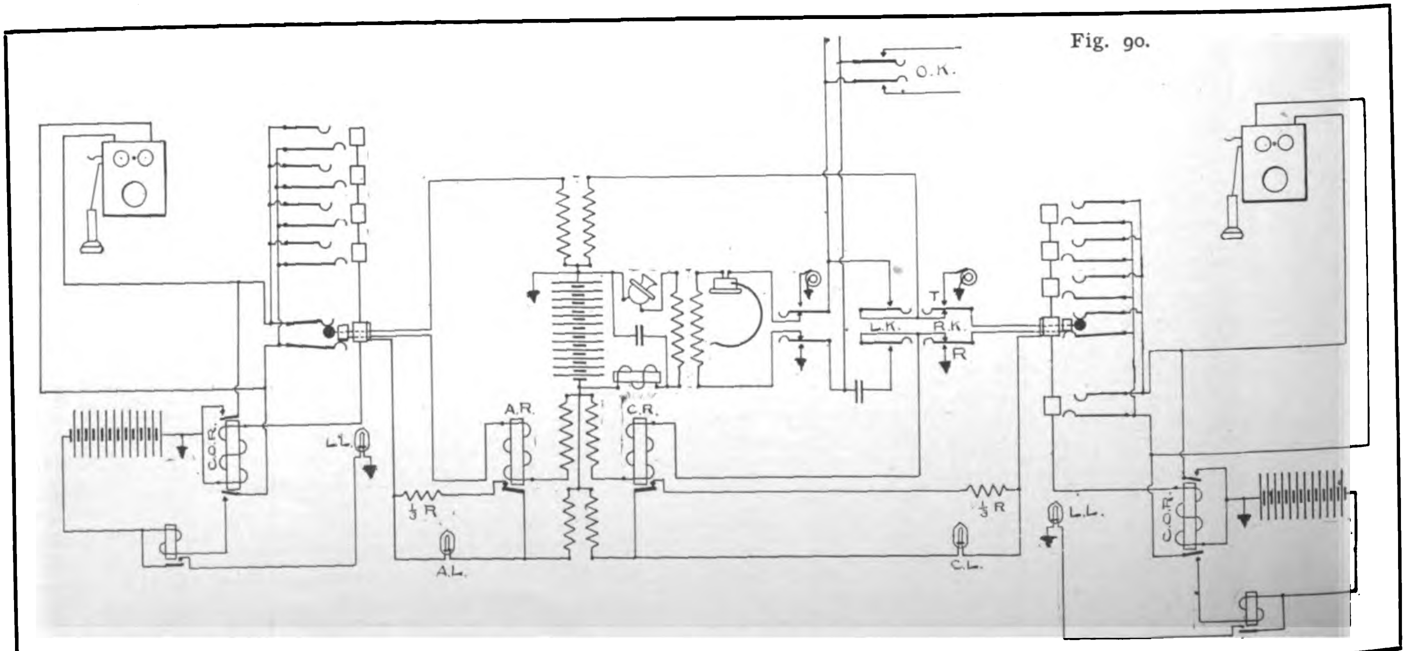


Fig. 90.

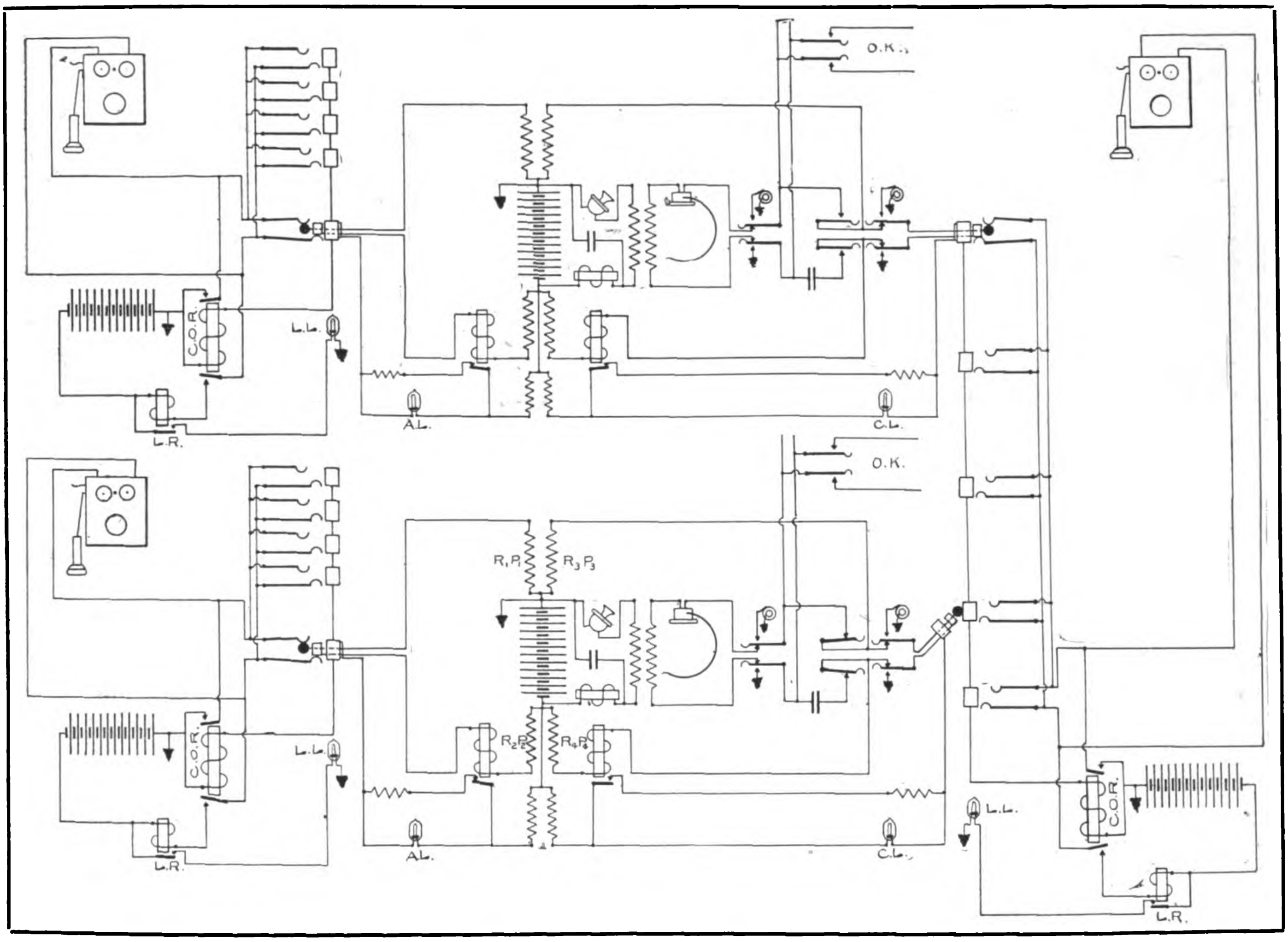


Fig. 91.

relays are energized and therefore both lamps are out. Both cut-off relays are open, and consequently, the line lamps are both out. If one party hangs up the receiver, his supervisory lamp lights. The party whose lamp is still out is not ready to clear out. If another party is desired, the subscriber is supposed to raise and lower the receiver hook, which flashes the lamp, and attracts the operator's attention.

Fig. 91 shows a complete connection between two parties, and another operator in the act of testing. The original sleeves of the jacks of the now busy line had a potential of that of the earth. If the operator had tested before the preceding operator had taken possession of the line, the touch of the tip of the calling plug to the sleeve of the jack would have had no result.

If the second operator touches the tip of her plug to the sleeve of the jack, which is busy, the battery existing on the sleeves will find a path through the tip of the plug, and back to ground through one quarter of the repeating coil.

Touching the tip to the sleeve, the battery of the upper cord circuit flows through the lamp to sleeve, thence through the contact of the key, to the quarter of the repeating coil, R^3P^3, through to the positive side of the battery.

The operator's key being closed, the wave induced by this energy passes through the only path it can find, the bridged telephone set. If the subscriber is waiting at the answering cord end, he will hear the test, because his half of the coil also induces a rush of current, which finds a path through his telephone set.

Fig. 92 shows the outline of a busy test, just as the tip is withdrawn from the sleeve. The plug is shown without the ring and sleeve, as these are not used in receiving a test. It shows the listening key closed, putting the receiver across the line.

Fig. 93 shows the outline of a talking circuit between two parties of a common battery repeating coil system, with the old local battery telephones still in use. *AR* and *CR* are the cord relays, and the *RP's* the quarters of the repeating coil.

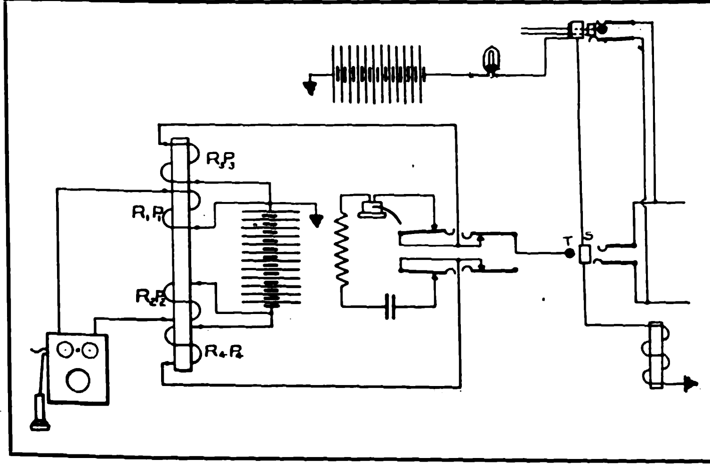


Fig. 92.

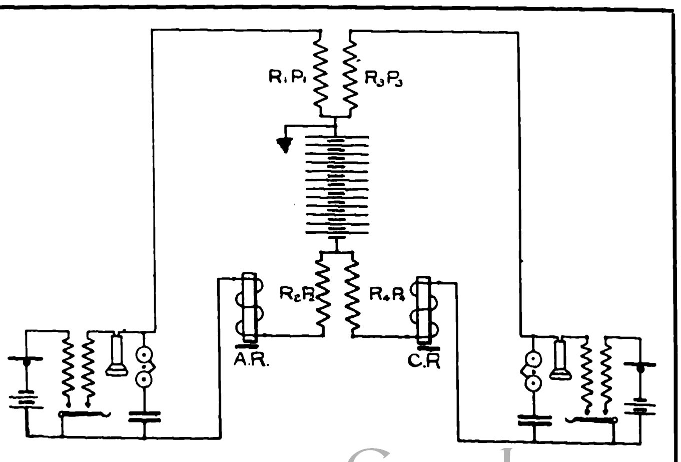
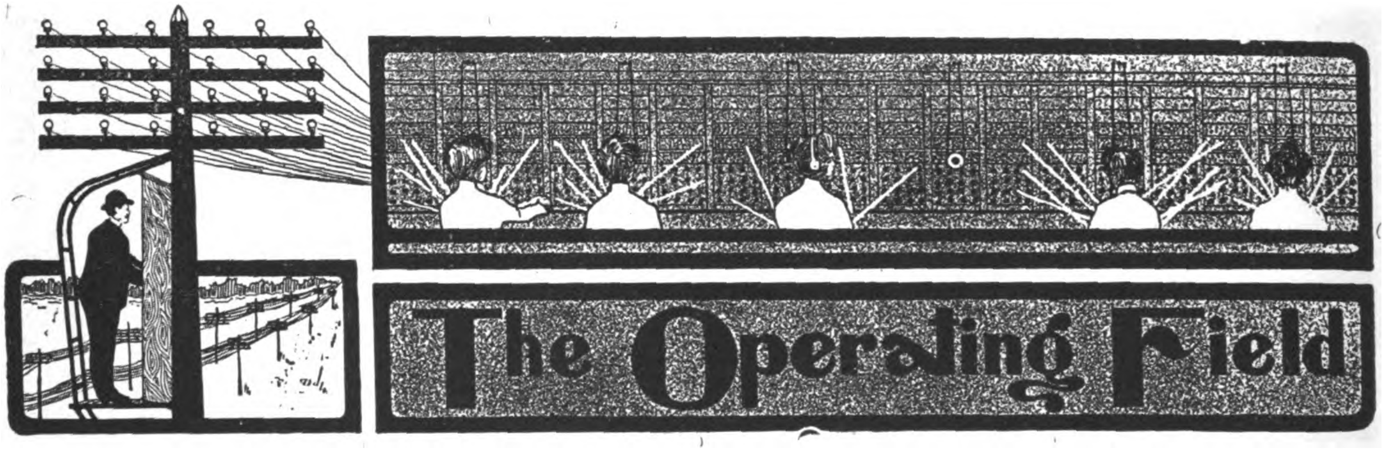


Fig. 93.



STATUS OF ALBANY HOME COMPANY.

THE Albany Home Telephone Company of Albany, N. Y., was recently the subject of a vitriolic attack on the part of the *United States Investor*, a paper which, so far as can be learned, carries absolutely no weight in the financial world. The article in question was designed to depreciate the securities of the Albany Company and to create disquiet among the present holders. It was on the order of the usual Bell press literature, giving falsified statements and all the usual stock arguments which have been answered time and again in these columns. In answer to the article Mr. H. J. Prince, Jr., secretary of the Home Company, makes this statement in a letter to THE AMERICAN TELEPHONE JOURNAL:

"That the report is an emanation from the office of our competitor in the telephone field, the Bell Company, is only too clear. It is filled with inaccuracies as to time and date and misleading statements galore concerning our capitalization, equipment and number of subscribers. But a little insight into the facts as brought out in our first annual report, May 1, will prove the absurdity of the garbled article published and tend to show to what straits of desperation we have driven our competitor, which so recently was the only telephone company serving the public in this city.

"The Home Telephone Company was incorporated May 1, 1901, with an authorized capital of $750,000.00, divided into $250,000 preferred 6 per cent. cumulative stock and $500,000 common stock. It was our original intention to build the exchange from the proceeds of the sale of both the preferred and common stock, but we found that it would be a better financial proposition to issue bonds for that purpose and retire the preferred stock, giving bonds to an equal amount in exchange. It was so authorized and bonds to the amount of $350,000 6 per cent. first mortgage were issued, certified by the Knickerbocker Trust Company, of New York City as trustee, retiring the preferred stock and leaving the common stock, together with the bonds, only on the market. To introduce our bonds to investors, in a few instances a stock bonus of 25 per cent. (not 50 per cent. as claimed) of the par value of the bond was granted. This privilege at this time, one year from date of issue, is withdrawn, as our securities have obtained a ready market and are now only issued at par, the *United States Investor* assertion to the contrary notwithstanding.

"Our progress from the very beginning has been most satisfactory. Starting on January 1, 1903, four months ago, with 500 telephones in operation, we have to-day 1,900 stations. By agreement with our subscribers we were not to charge rental until 1,000 stations were in operation, not 3,000, as asserted. The requisite one thousand was reached on February 1 last, from which time all our connected subscribers have been on a paying basis. But twenty-five telephones were installed absolutely free, and they are in various city offices and departments and were a part consideration of our underground franchise.

"In regard to franchises, which it is claimed we cannot readily acquire, we have had absolutely no difficulty whatever in securing all the franchises necessary to complete our exchange. Our rates are most attractive, service perfect and equipment modern and strictly up to date, and new contracts coming in every day. We have over 2,800 subscribers, as against 3,400 of the Bell Company. The 500 stations installed by them since November last, so stated in the article, are pay stations only and not bona fide subscribers, although claimed as such. A large portion of these were

NOTICE!

On account of the continued rotten service of our Sunset Telephone, we are forced to request that our patrons hereafter call us over the Home phone 2292.

For the past three days our Sunset phones have been out of order, and upwards of twenty requests for their repair have been phoned into the various and sundry departments conducted by the Sunset people to try the public patience, with nothing done—not even a call; therefore the above action. However, to show our good will we will continue to pay the Sunset bills and extend until June 1st for repairs. Those who have plenty of time may continue trying to reach us over our Sunset phones, for two or three men are in the office all the time to answer the phone and give first class service in advertisement writing, designing, engraving, illustrating, printing and distributing advertising matter.

Respectfully,

The Musselman Co.

Sunset Phone Main 1472
Sunset Phone Black 2811
Home Phone 2292

P. S.—Our suit for damages against the Sunset Telephone Company for bad service will soon be brought up in Department 5 of the Superior Court, and we desire those who have poor service to watch the outcome.

Above is printed an advertisement which was recently published in a Los Angeles newspaper. It illustrates forcibly the feeling on the Pacific coast as far as the Bell telephone companies are concerned. Other notices of a similar character have lately been printed. When the feeling for a company is so cordial that a subscriber will use valuable advertising space to let the public know how poor his service is there must be something radically wrong.

Several former patrons of the Bell company after their Independent telephones had been installed placed the Bell telephones in the street. One who had been given exceptionally poor service placed a placard over his which read: "DISCARDED BECAUSE IT WAS ROTTEN. CALL US OVER THE HOME PHONE."

put in to replace instruments ordered out since we came in the field.

"Our equipment calls for an ultimate capacity of 7,200 lines, our switchboard is of the latest design, combining multiple and lamp signal systems; our outside construction is as nearly perfect as possible, involving four miles of underground conduit, and providing a single metallic circuit to each subscriber.

"We own our exchange building, erected specially for our sole occupancy; we owe no bills except for current expenses, paying all bills on the first and fifteenth of every month. Our bonds have never been rejected by any of our banks and we have information that quite a few are now held by various Albany banks. In fact, quite a number of bank officials invested in our securities and consider them first class in every respect and we have no knowledge that any of our securities are offered in the open market.

"Our attention was called to the article in the *Investor*, and the matter of proceeding against the paper was taken up by our Board, but after making inquiries as to it we were unable to learn that it was of any financial responsibility. Further, we could not learn that it carried any weight in the financial world, or that any attention was paid to its various articles; in fact, we were informed that its columns were for sale, and as long as the money was forthcoming it mattered little as to the truth or falsity of its assertions. We therefore concluded to ignore the article.

"We and our investors are satisfied with the progress we have made, and also with our future, which could not be brighter."

JUDGE THOMAS' SUCCESSOR.

SEVERAL names have been suggested for a successor to Judge J. M. Thomas as president of the National Association. The most prominent, and a man who would be most acceptable to a majority of the members of the Association, is Congressman James W. Tawney, of Winona, Minn. Mr. Tawney is at present an officer in the Minnesota State Association. He has great organizing ability and besides has considerable knowledge and experience in the technical and business ends of the telephone business.

TELEPHONES ON A RIFLE RANGE.

RECENTLY a rifle tournament was held in New Jersey, the object of which was to determine who were the 12 best marksmen in the country, so that they could be placed on an all-American team which is to soon compete with the English marksmen for the international championship.

The photograph, which is taken from the *Illustrated Sporting News*, of May 30, shows the method used for the transmission of scores at the above mentioned contest. Telephones were used, one at the scorers' tent and the other at the targets. By this means almost as soon as a shot was made the judges were in possession of its value.

It has been customary in the past to signal the scores made by the marksmen from the targets to the scorers, who in a contest of this kind are 1,000 yards distant. The signaling was done by means of different shaped geometrical figures, which were held up at the targets so that they could be seen by the judges. This was done after each shot. Each figure denoted a different score. The judges understood these and could mark the man shooting accordingly. In some cases the scores were made known to the scorekeepers by the use of the flag signal code, which has been adopted by the United States Army. A signalman was stationed at the targets who would, by swinging a flag according to the usual code, communicate what score had been made by the marksman to the point where the judges were stationed. Both of these methods had many disadvantages. Very often disputes and misunderstandings would arise which could only be settled by sending a messenger a thousand yards to the targets, and occasionally several trips would be required before the complication could be straightened out. All this consumed much time, but as these were the only methods then practicable, they did service for many years. As told at the beginning of this article, telephones have now been adopted with perfect success.

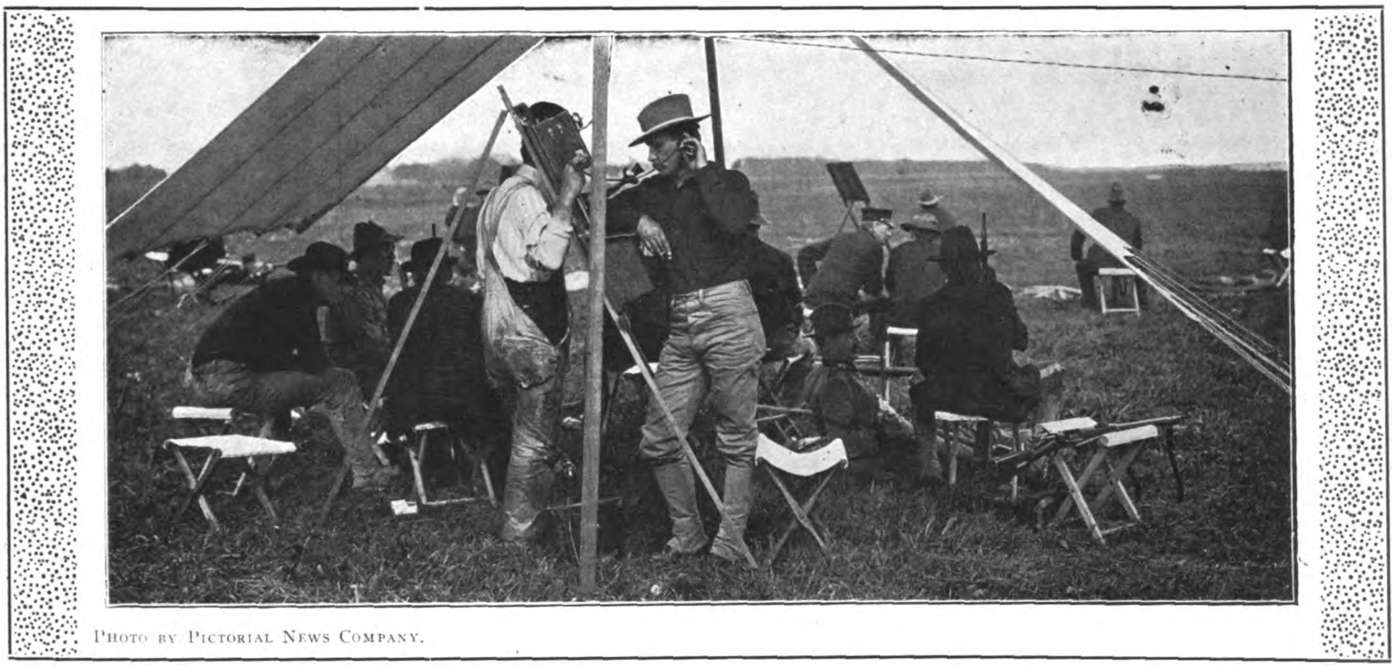


Photo by Pictorial News Company.

Telephoning to the Butts, 1,000 Yards Away.

As the rifle ranges are deserted the greater part of the year, the systems used are only temporary, as the wire and instruments would be stolen if left at the range. When in operation the telephones are held on an easel-like support which folds up and may be readily packed. Rubber covered duplex wire of a good quality is used for conducting the current. Ordinarily poles are not necessary, as the rubber-covered duplex wire gives ample insulation when laid along the surface of the ground. It has been found better to use duplex than a ground return, as the cost of the second wire is more than compensated for by the trouble of getting a good ground.

"HELLO GIRLS" CHEAP.

INDEPENDENT telephone managers who are desirous of cutting down their operating expenses may be interested in an item which appeared recently in a western newspaper. It seems that the Bell Telephone Company in Butte, Montana, had an operators' strike on its hands. The fact had been quite widely advertised in the newspapers and one morning the manager of the Rocky Mountain Company got a postal card from Mexico, which read as follows:

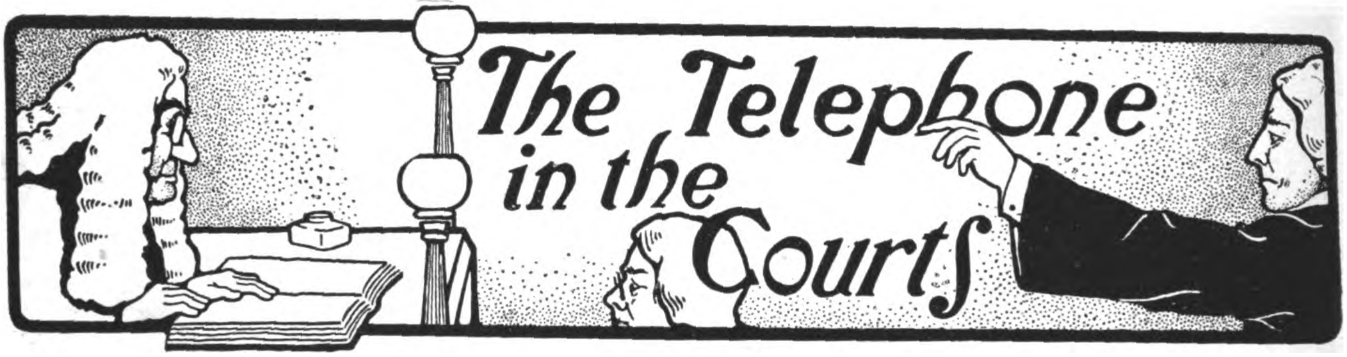
"*Tamaulipas.*

"Sr. A. G. Miller, Butte, Mont., U. S. A.

"May Sr. Miestro: I understand your company wish to employ 500 hello girls. I can furnish you 50 at 48c. Mex. money per day & board themselves. But they are unable to understand English. If you wish them send a stock car at once and route it via O. S. L., U. P., A. T. & S. F. and F., C. C. M.

"Que Su Mano Besa,

"Apatzingan."



The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

OCCUPYING CITY STREETS WITHOUT RIGHT.

As the result of prolonged litigation between the East Tennessee Telephone Company and the Anderson County Telephone Company over the occupation of the streets of Lawrenceburg, Ky., it has been discovered that both companies are occupying the streets without authority. In August, 1899, the East Tennessee Company sued out an injunction against the Anderson County Company and enjoined it from erecting its line along the streets of Lawrenceburg upon the ground that by contract with the city the complainant company had the exclusive right to establish and operate a telephone system therein. The Anderson County Company defended this suit upon the ground that the ordinance adopted by the city council granting the franchise to the plaintiff did not lie over five days as required by law and was therefore void. This contention was sustained and the East Tennessee Company's petition dismissed. (See East Tennessee Telephone Company vs. Anderson County Telephone Company, 57 S., W. 457.) Then the Anderson County Company brought suit on the injunction bond executed by the East Tennessee Company at the institution of their suit and asked for damages for being wrongfully enjoined. The East Tennessee Company contended that the Anderson County Company had no right to use the city streets because it had not obtained permission from the city council to do so; that having no legal right there it could not have been damaged by the injunction suit. The lower court overruled the defendant's contention and a trial resulted in a verdict in favor of the plaintiff for $2,000.

The Supreme Court of Tennessee has reversed this judgment. In deciding the case it said that the section of the State Constitution requiring telephone companies to obtain permission from city councils before erecting their lines along public streets was mandatory and must be followed to give companies the right to occupy them. The Anderson County Company failed to comply with it and so it is clear that it has no right to occupy the streets of Lawrenceburg. In this action they can recover only upon the ground that they were prevented by an injunction from exercising a lawful right to occupy the streets of the city with their plant.

East Tennessee Telephone Co. vs. Anderson County Telephone Co., 74 S., W. 218.

TELEPHONE RECEIVERSHIP STANDS.

The present receivership of the Spokane and British Columbia Telephone and Telegraph Company must stand as the result of a per curiam decision of the Supreme Court of Washington. The receiver of the company was appointed in accordance with a petition of one Fernald, who held a mortgage of $15,000 on the property of the company. Mr. Fernald in his complaint alleged that the business and property of the company had been ruined as a result of the breaking of a contract between it and the Inland Telephone and Telegraph Company. The two companies, he alleged, had a contract for exchanging messages, but the Inland Company after a time refused to receive messages from and transmit messages to the Spokane Company, and also caused the wires connecting the Spokane Company's line with the exchange office in Spokane to be cut. This conduct, he alleged, deprived the Spokane Company of the profits it would have derived from a contract with the Columbia Telephone-Telegraph Company of Canada, and altogether resulted in the ruin of the Spokane Company. The latter brought suit for $205,000 damages. This suit was subsequently settled between the parties without Fernald's knowledge and he alleges as a result of a conspiracy to defraud him of his security under his mortgage. He thereupon sued for the appointment of a receiver and damages of $205,000. The receivership was granted after attorneys claiming to represent the company had waived right of formal notice to the company.

Another attorney, claiming to represent the company, then appeared and petitioned for the vacation of the receivership order on the ground that the former appearance was not authorized. The attorneys who first appeared were employed by Vice-President and Acting President Babcock, of the Spokane Company, the president having resigned and being absent from the country. The court appointed a new receiver, but refused to vacate the order. The company appealed and the judgment of the lower court was affirmed. The question upon which the decision of the Supreme Court hinged was thus stated in its opinion: Had the acting president power to employ counsel and authorize the appearance? The court said: "When the president of a corporation authorizes an attorney or solicitor to prosecute or defend a suit or to commence any legal proceedings in which the corporation is interested the attorney or solicitor will be authorized to appear for the corporation and such corporation will be bound by his acts. And, if the president exceeds his authority in retaining counsel, the corporation must look to him for any damages sustained in consequence of such unauthorized act." The appearance of counsel employed by Acting President Babcock was therefore authorized.

Fernald vs. Spokane and British Columbia Telephone and Telegraph Company, 72 Pac., 462.

A QUESTION IN REAL ESTATE LAW.

An interesting question in real estate law was recently disposed of by the Supreme Court of New York in the case of Myers against the Bell Telephone Company, of Buffalo. The defendant set eight poles along a highway adjacent to the premises of the plaintiff. The plaintiff brought action to eject the company from its occupation of the highway. The sole question in the case was whether the plaintiff owned the fee of the highway in which the poles were placed. The highway had existed through plaintiff's farm upwards of sixty years. In 1867 Benjamin Long, then owner of the farm, conveyed it by warranty deed to one Johnson, and after the description in the deed this clause appears: "Reserving all highways and the Buffalo and Niagara Falls Railroad as now laid down." This clause appeared in every subsequent conveyance, except one, including the one that vested the plaintiff with title in 1897. If Long reserved to himself the fee in the highway then plaintiff never owned it; if the effect of the reserving clause was limited to the easement of the public therein, then the plaintiff acquired the fee thereof and might maintain the action.

The court laid down the three following rules of construction:

(1) That an exception or reservation must be construed most favorably to the grantee if any ambiguity or uncertainty arises over its meaning.

(2) That the grantor intends to convey all the interest owned by him in the premises described unless the intent to pass a less estate is expressly manifest in the deed or is fairly to be implied from the terms of the grant.

These canons of construction, in harmony with circumstances indicating that it was the grantor Long's intention to convey the fee, led the court to reverse the inferior court's decision in favor of the defendant and hold that plaintiff might maintain her action.

Myers vs. Bell Telephone Company, 82 N. Y., S. 83.

PATENTS ISSUED

PAY STATION APPARATUS.

Charles E. Scribner, of Chicago, Ill., patents (No. 728,309), a coin collector for telephone pay stations, and assigns his invention to the Western Electric Company. Fig. 2 shows a front elevation of the device. Fig. 3 a section on line 3 3 of Fig 2, and Fig. 4 a section on line 4 4 of Fig. 2. This toll box is of the general type shown in the patent of A. M. Bullard (No. 665,874), the present patent relating to improvements in the coin chute, controlling mechanism and electrical contact device. The coin chute a is formed by a slot in the brass plate d, the plate being fastened to the back of the iron toll box. The outer wall of the chute is formed by the plate d^2 fastened to the face of plate d.

The central portion of the chute is expanded to form a supplementary channel a^1 opening off the main chute, as shown. The mouth of this channel forms a gap into which coins will be shunted.

At this point a distributing mechanism is provided controlling the disposition of the coin. Two pins 2^1 2^2 normally project into the supplementary channel and catch and support the deposited coin. These stops are separated so that coins of less than a given size will not be stopped but will fall through between them and strike the projection d^3 and be deflected into the return chute a^2. Until a deposited coin has been disposed of, it will serve to deflect other coins into the return chute and thus prevent blocking the slot. The two stops e^1, e^2 are mounted upon a pivoted rocking lever e, which forms the armature of a polarized electro-magnet f, adapted to be tilted to one side or the other according to the direction of current flowing through the coils of the magnet. When thus tilted one of the stops will be withdrawn from the chute, and the other thrust further in.

Fig. 2.

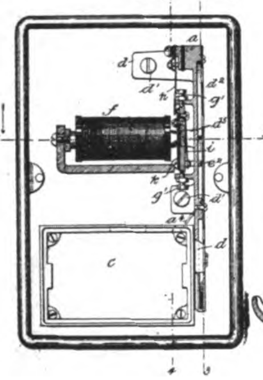


Fig. 3.

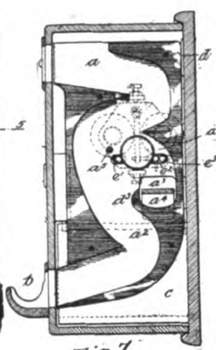


Fig. 4.

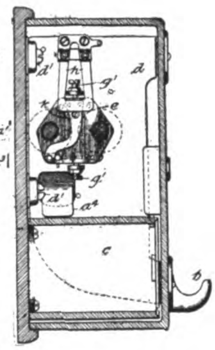


Fig. 7.

The pin s is provided near the centre of a^1 in position to direct a coin, so that it will fall between the stops e^1 e^2. The stop e^1 is stationarily mounted on the armature, as shown in Fig. 7, the stop e^2, being pivoted to the armature and carrying a platinum contact adapted to engage a contact on the stationary stud e^3. The stop e^2 is prevented from making contact with e^3 by the spring i, except when forced into contact by a coin resting on the stops e^1 and e^2. The spring h forms one terminal of the electrical circuit and the grounded metallic casing of the toll box the other. When a coin is deposited the stop e^2, which is connected through the contact points g^1 g^1 with the grounded frame work, is brought into contact with stud e^3 through spring h, to the line, thus closing the circuit from line to ground, the spring h being connected through the magnet f to one side of the line.

PAY STATION.

William S. Paca, of Erie, Pa., patents (No. 728,964) a telephone toll slot machine. The invention, which is shown in the figures, has for its object the production of a slot mechanism which will signal the insertion therein of coins of different values, and at the same time fail to operate upon the insertion of mutilated coins or blank discs, and which will also prevent the clogging and disabling of the mechanism. Fig. 2 shows a side elevation of the invention, Fig. 3 a perspective view of plates 1, 2, 3, and Fig. 7 a view of the under surface of the machine, with portions of the box broken away.

Fig. 2.

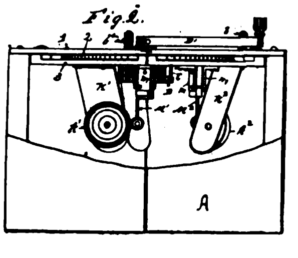
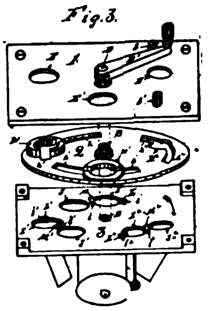


Fig. 3.



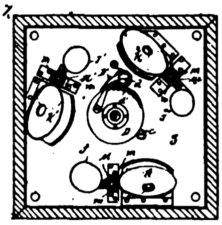
A shaft B, provided with a crank B^1, is journaled in plates 1 and 3, and carries upon its lower end a retracting spring, C, which is secured to a stud in plate 3.

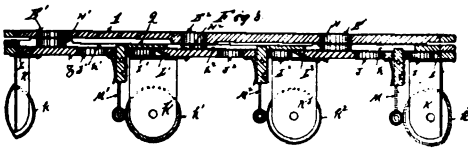
Upon the shaft B below the spring is a ratchet wheel, as shown in Fig. 7, which prevents the backward movement of the shaft B before it has completed its full forward movement, the movement being limited by the studs b and b^1 on plate 1.

On the under surface of the plate 3 are secured standards K, K^1, K^2, to which bells k, k^1, k^2 are secured, the bells being of different tones and thus giving distinctive signals, and on plate 3 are secured ears, m, in which spring actuated bell hammers, M, M^1, M^2, are pivoted, the heels of the bell hammers extending through openings l, l^1, l^2 in the plate 3 into the radial grooves h, h^1, h^2, in plate 2, as shown in Fig. 8, this figure being a developed view of the interior, so that when a coin is moved around to either of the discharged openings I, I^1, I^2 it strikes the heel of one of the bell hammers and during its passage to the discharge opening operates the hammer, which, striking the bell, sounds the appropriate signal.

A coin being inserted in the proper opening in plate 1 the crank B^1 is moved into contact with stop b^1, plate 2, being thereby rotated and the coin passing out of the discharge opening in plate 3. The crank B^1 being released, is brought back to stop b by means of the spring C. In case a coin is thicker than normal it blocks the movement of the crank B^1, and if the coin has too small a diameter it will drop through the oval discharge opening in plate 2 without striking the bell hammer. If the coin be too thin it will pass under the heel of the bell hammer and out at the proper discharge opening at plate 3, without operating the hammer.

Fig. 7.





CIRCUITS.

Johnstone Stone, of Cambridge, Mass., patents (No. 729,103) and (No. 729,104), electrical apparatus and circuits for electrical distribution and selective distribution and a method of electrical distribution and selective distribution, and assigns to the American Bell Telephone Company. The general arrangement of the circuits is shown in Figs. 3 and 4.

The invention depends upon the resonant property of electrical circuits which enables a circuit containing a given amount of capacity and inductance to select, and become responsive to, only those frequencies for which it is designed. In Fig. 3 is shown a main circuit, and associated with it a number of tuned or resonance circuits, the primary windings of the transformers for the resonant circuit being connected in series in the main circuit. In operation each resonator circuit selects from the electromotive forces impressed upon the main circuit that particular one to which it is designed to respond, and a current is developed thereby in the circuit which is not appreciably interfered with by currents produced in the other circuits. Where the invention is used in connection with selective signalling, the signal receiving apparatus is placed in each of the several circuits, and currents of different frequencies used for signalling.

Fig. 3.

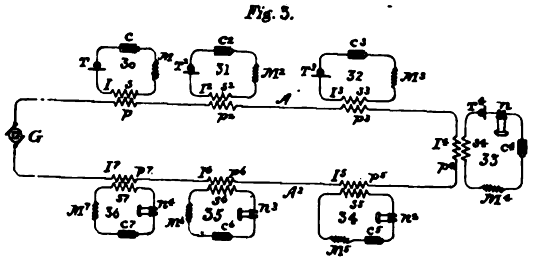
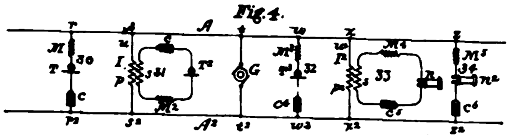


Fig. 4.

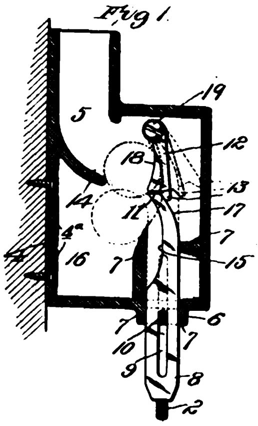


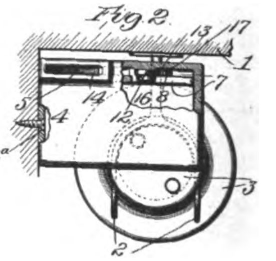
In Fig. 4 the resonator circuits are shown in multiple across the main circuit. In the operation of the system the resonator circuits may be provided with transmitters and receivers, as shown, and the individual circuits may be so tuned as to be responsive only to other predetermined circuits.

PAY STATION.

William H. Scott, of St. Louis, Mo., patents (No. 728,994) a telephone lock, and assigns to the Controller Company of America. The device, which is shown in Figs. 1 and 2, consists of a box intended to be fastened near the telephone in locking relation with the hook switch. The insertion of a coin in the slot 5 forces the locking dog 12 from its locking position and allows the spring of the hook switch to force the slide bar 8 upward, which in turn forces the locking dog farther backwards, as shown in the figure, allows the coin to fall into the recessed portion of the slide bar and thence into the box. Placing the receiver upon the hook restores normal conditions.

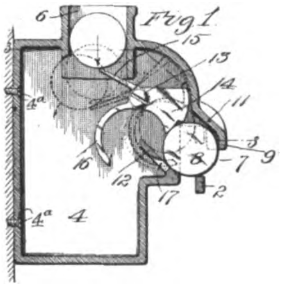
William H. Scott, of St. Louis, Mo., patents (No. 728,995) a coin controlled blocking mechanism and assigns to the Controller Company of America. The device, which consists of a box, is

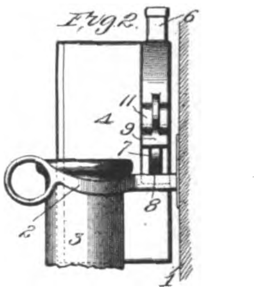




intended to be mounted on the wall near the telephone, as shown in Fig. 2, so that the disc 8 locks the hook switch in its down position. The coin box 4 is provided with a raceway, 6, for the insertion of coins.

A coin being inserted in the slot drops upon the receiving arm 15 of the locking lever and by its weight carries the arm 14 out of locking relation with the disc 8, the movement being limited by the stop arm 16. The locking disc 8 is moved by the spring of the hook switch, the receiver having been removed, and is forced upward and inward, allowing the stop arm 16 to be moved sufficiently to permit the coin to be discharged into the box. Replacing the receiver upon the hook restores normal conditions.



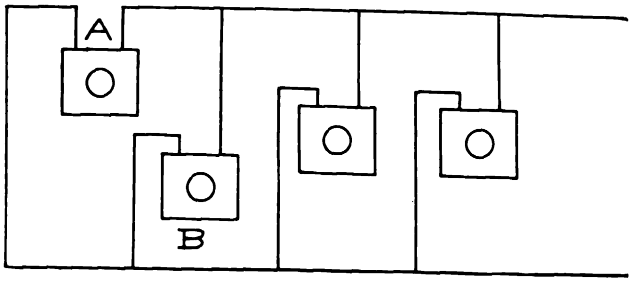


ANSWERS TO QUESTIONS

Queries on any subject relating to the technical [illegible] of telephony will be answered in this column.

SERIES TELEPHONE ON BRIDGED LINE.

For accommodation, we placed a series telephone on a bridged line for a few months. Its generator was powerful enough to ring seventeen 1,600-ohm telephones. What would be the effect to substitute high-wound coils for the low-wound? Would it be necessary to wire the telephone differently? A. G.



Query does not state how the series bell is to be placed in the line. If it is to be bridged as shown at *B* in diagram, high wound coils will be an advantage. If it is to be placed in series as shown at *A*, it will be a disadvantage.

INDUCTION TROUBLES.

We have a two-arm, ten-pair No. 14, B. & S. gauge copper line between two and three miles long used for trunking between our main and sub-exchanges. During the day we get the familiar noise from the motor of the trolley line, and at night the buzzing noise from A. C. circuit. We can also detect slight cross talk in our tests, but this is not of a serious nature. The lines are metallic and are free from grounds, etc. Will you kindly suggest a good scheme for transposing these lines? A. S.

It is difficult to specify the best method to overcome the inductive difficulties mentioned in your inquiry.

1st. The lines should not only be free from grounds, but should be well insulated, having not less than 10 megohms per mile.

2nd. If thoroughly insulated, sufficient transposition will probably affect a remedy. Usually each circuit should be transposed as often as every 1,300 feet. If this is not sufficient, it may be necessary to transpose as often as every pole.

The best way would be to go over the line and find out where the induction comes in and then put in sufficient transpositions to render the circuits satisfactory.

The Week's Messages.

FINANCIAL

PEKIN, ILL.—The capital stock of the Citizens' Telephone Company of Pekin will be increased to $200,000. Construction of toll lines is in contemplation.

ROCK ISLAND, ILL.—A special meeting of the stockholders of the Union Electric Telephone and Telegraph Company will be held at the office of the company in this city the 3d day of July, 1903, for the purpose of submitting to a vote of the stockholders the question of increasing the capital stock of said company from $400,000 to $550,000, and for such other business as may be brought before it. The directors are: Charles A. Lee, John W. Morrison, John A. Fritchey, George B. Stucker, James Russ, N. Hamilton.

IOWA FALLS, IA.—Amended articles of the Central Iowa Telephone Company of Iowa Falls have been filed increasing the capital stock to $200,000.

OBERLIN, KAN.—The Central State Telephone Company, of this town, valued its line for taxation at $1,847 and reported the gross receipts for the year $316. The Atwood-Colby line was valued at $730 and the receipts reported at $83.

TOPEKA, KAN.—The State Board of Railroad Assessors has completed assessing the railroads, telegraph and telephone lines of the State. The Fairview Telephone Company, which was assessed last year at $3,003 a mile, was raised to $3,540. The Northeast Kansas Telephone Company was raised from $6,533 a mile to $12,528. Sabetha, which paid nothing last year, is listed at $3,756 a mile. The report shows that there are nearly sixty Independent telephone companies in the State.

IRON MOUNTAIN, MICH.—The Menominee Range Telephone Company, which serves Iron Mountain, Florence, Norway and other towns in that section, and which was started in opposition to the Bell people several years ago, has enjoyed a good patronage and is making money. The annual dividend has just been declared. It was 10 per cent.

FULTON, MO.—The bond of the Kinlock Telephone Company, in the sum of $1,000, for the faithful performance of the terms of its franchise to construct a line through Fulton, has been accepted.

ST. LOUIS, MO.—The Kinlock Telephone Company, of St. Louis, reports gross earnings of $178,334, net after charges and taxes of $44,524 for the first four months of 1903. For the 1902 year, it earned gross $472,137, net after interest and taxes of $113,037.

WAHOO, NEB.—The Golden Rod Telephone Company, of Wahoo, has filed amended articles of incorporation increasing its capital stock from $50,000 to $150,000.

ENFIELD CENTER, N. Y.—An amended certificate of incorporation has been filed by the Trumbull Corner Telephone Company, of Enfield Center. The amount of the capital stock is to be $2,000, and the general route is upon the highways in the towns of Newfield, Danby, Enfield, Ithaca and Ulysses, in Tompkins county, and the towns of Hector and Katherine, in Schuyler county.

LONDON, O.—The London Home Telephone Company, of London, has increased its capital stock from $125,000 to $200,000. W. M. Jones is the president and W. J. Meech secretary of the company.

FRANCHISES

COLORADO SPRINGS, COLO.—The city council has decided to leave the matter of a franchise for the new Citizens' Automatic Telephone Company in the hands of the people, and should the company be willing to pay expenses of advertisement, the council will order a special election. If granted franchises from the various cities, a toll line service will be started between Denver, Colorado Springs, Pueblo and other points. President D. V. Donaldson, of the Colorado Springs Mining Stock Exchange Association, and Treasurer F. G. Peck, of the Portland Gold Mining Company, are heavily interested in the new company.

GALESBURG, ILL.—At a meeting of the Knox county supervisors a petition was presented by the Wataga Farmers' Mutual Telephone Company, of Wataga, to construct and operate a line in Sparta and Henderson townships under the usual restrictions.

PORTLAND, IND.—The Hoosier Telephone Company, capital stock $100,000, has secured a franchise in Portland, and it will build an exchange. The Hoosier system will be extended through the following counties, connecting with the village and town plants therein: Jay, Adams, Wells, Huntington, Wabash, Miami, Howard, Grant, Blackford, Randolph, Delaware, Madison, Tipton, Hamilton, Marion, Hancock, Henry, Wayne, Union, Rush, Fayette, Shelby, Johnson, Bartholomew, Decatur and Franklin. Judson A. Jaqua, president.

WABASH, IND.—The franchise of the Central Union Telephone Company in the city of Wabash has expired by limitation. The company has not yet asked for a renewal, and if it does it will be opposed by the stockholders of the local company, which now has the bulk of the business. The stockholders of the local company are influential business men of Wabash, and they will urge the council at its next meeting to take steps to oust the Bell Company and remove the property from the streets.

FREMONT, NEB.—At a special meeting of the city council it was decided to grant the petition of the Independent Telephone Company for an amended franchise. The original petition was withdrawn and the new one filed asking for permission to raise the rate $2 per telephone earlier than January 1, 1905, provided there were 700 telephones in use run from the local switchboard, and not less than 100 miles of country lines.

TROY, N. Y.—The Troy and Northern Telegraph and Telephone Company has received permission to do business in Vermont, and a certificate of incorporation in that State has been filed. The company is constantly adding to its list of subscribers, and will soon be in readiness for business.

YORKVILLE, N. Y.—At a meeting of the Board of Trustees of the village of Yorkville on Tuesday, William L. Foley, representing the Home Telephone Company, applied for a franchise for a line to run through the village. The matter will be considered at the next meeting.

NASHVILLE, TENN.—Application has been made to the City Council by the Tennessee Telephone and Telegraph Company, through Sanford Duncan, president, for a fifty-year franchise for a conduit system. A bonus of $110,000 is offered for the privilege. The proposition was placed on file, the city having just granted a franchise to other parties for a similar purpose.

SALT LAKE CITY, UTAH.—The City Council at a recent meeting passed the ordinance granting a franchise to the Independent Home Telephone Company. Managing Director Elmer V. Jones appeared in behalf of the company and agreed to all the amendments asked by the Council. The Mayor signed the ordinance.

MARINETTE, WIS.—The Wausaukee Telephone Company has been granted a franchise to enter the city. It is an Independent company connecting Crivitz, Wausaukee and other towns in the county. The Automatic Electric Company and the American Electric Telephone Company of Chicago have also applied for franchises to establish an exchange in the city.

ELECTIONS

COURTLAND, CAL.—The following were elected as directors of the new Freeport Telephone and Telegraph Company at the stockholders' meeting of the company held at Courtland: W. J. Smith, Frank Kunsting, H. D. Kerchival, M. Jongeneal, L. D. Greene, P. H. Gardiner and William Johnston. The board organized and elected W. J. Smith president, Frank Kunsting vice-president, H. D. Kerchival secretary and manager.

UNITY, ME.—At the annual meeting of the Unity Telephone Company the following officers were elected for the ensuing year: Secretary, Frank Bartlett; president, E. E. McCauslin; vice-president, E. D. Chase; general manager, E. E. McCauslin; directors, R. E. Stone, Joe Harding, Dr. M. T. Dodge, E. E. McCauslin, E. D. Chase, Frank Bartlett, Ben Mudgett; treasurer, Charles Cook.

THE WEEK'S MESSAGES—Continued.

FREDERICTON, N. B., CAN.—At the annual meeting of the stockholders of the New Brunswick Telephone Company, the following officers were elected: Hon. A. G. Blair, president; J. L. Black, vice-president; Senator Thompson, managing director; W. E. Smith, secretary and treasurer.

SCHENECTADY, N. Y.—At the first annual meeting of the Schenectady Home Telephone Company, held recently, the new plant which was built by the American Construction and Trading Company, was turned over to the local corporation. There are a large number of contracts waiting for service. The long-distance lines are being extended rapidly, and in a short time over 6,000 telephones can be reached over the company's lines. The stockholders elected the following directors: J. F. Deems, H. C. Hecquemborg, E. S. Kellogg, James McNaughton, Charles F. Veeder, Chas. E. Palmer, H. E. Webster, James M. Andrews, A. J. Quackenbush, of Schenectady; S. B. Rawson, T. H. Griswold, F. H. Sudro, T. M. Brush, E. E. Williams, of Elyria, O.; Howard Hendrickson, of Albany. The following officers were re-elected by the directors afterward: President, Charles F. Veeder, Schenectady; vice-president, T. H. Griswold, Elyria, O.; secretary and manager, S. M. Strong, Schenectady. E. S. Kellogg was elected treasurer to succeed F. H. Sudro, of Elyria.

BARRE, VT.—The Washington County Telephone Company, in annual meeting here, voted to remain independent from the Orange County Telephone Company, and expressed as the sentiment of the meeting that Independent companies desiring to come into the city should deal with the city council in the matter of franchises. The following board of directors was elected for the ensuing year: E. W. Bisbee, Donald Smith, B. W. Hooker, Hemer Fitts, D. M. Miles, S. D. Allen and Frank McWhorter.

RATES

BALTIMORE, MD.—The Southern States Telephone Company, organized by Maryland capitalists to drive the Bell out with lower rates, has been granted permission to increase its rates one-fourth.

COMBINATIONS

INDIANAPOLIS, IND.—The new Long Distance Telephone Company of Indianapolis has purchased a controlling interest in the Lebanon Telephone Company. It is said that this is the initial step toward a movement of the Long Distance Company to secure a controlling interest in all the county seat and substantial town telephone plants through which its line passes.

RICHMOND, IND.—A controlling interest has been secured in the Richmond Home Telephone Company by Colonel Orr and L. M. Flesh, of Pequa, O., with Edward L. Gates, banker of Richmond. The new owners announce that no change will be made in the management, but that additional modern equipment will be installed and lines extended to meet the demands.

WINCHESTER, IND.—The Winchester Telephone Company, operating in Winchester, and the Eastern Indiana Telephone Company, with 200 miles of line throughout Randolph and adjacent counties, have consolidated. The company will reincorporate and be known as the Winchester Telephone Company.

DUBUQUE, IA.—Joseph A. Lattner, of Worthington, has sold the Epworth Telephone Company and the Union Telephone Company to the Interstate Telephone Company for $7.500. The bill of sale transferring such property has been filed with the County Recorder.

HUDSON, N. Y.—A certificate of merger of the Commercial Telephone Company with the Columbia Telephone Company, of Hudson, has been filed with the Secretary of State. The capital is $50,000 and the directors are: R. G. Foster, of New Hartford, Conn.; Benj. F. Case, of Canton Center, Conn., and Edmo Charles Getty, of Hudson.

NASHVILLE, TENN.—The Progress Telephone Company, of Bolivar, Hardeman County, has been absorbed by the Memphis Telephone Company. The Progress Company has been established for some years and is a successful concern. The Memphis Company is an independent concern, and is making connections through many counties in West Tennessee.

UNDERGROUND

PITTSFIELD, MASS.—The committee on electric wires reported a permit which gives the Berkshire Telephone and Telegraph Company the right to lay underground conduits in this city. The company has now secured permits in all the cities and towns in the county where it intends to run its lines, excepting North Adams and Adams. Work is to be started shortly.

TRENTON, N. J.—The fire committee of Common Council arranged to have plans and specifications prepared for the city's proposed system of underground police and fire alarm telegraph. As soon as the specifications are in shape bids will be asked for and the contract awarded. It has been estimated that the cost will be about $40,000.

MISCELLANEOUS

CANTON, ILL.—The 500 telephones, with which the Canton Home Telephone company was equipped as a starter, have all been taken, and the directors of the company have voted to add additional equipment to increase the capacity of the system.

RUSHVILLE, ILL.—At a recent meeting of the stockholders of the Rushville Telephone Company, it was decided that the capital stock of the corporation shall be owned and held only by such person, firm or corporation as rent telephone service from it, and no person, firm or corporation shall own or hold a number of shares of its capital stock greater than the number of telephones rented from this corporation; that no shareholder shall use or permit to be used in his or their or its place of business or residence, where the telephone of this corporation is used, any telephone connected with any other telephone exchange maintained in the city. Directors were elected as follows: D. H. Glass, C. B. Griffith, L. A. Jarman, H. F. Dyson, J. L. Scripps, A. P. Rodewald, H. T. Pemberton and Eugene Mallory.

STERLING, ILL.—The Interstate Telephone Company has completed the work of its double toll line to Aurora from the local office. Each line is composed of two copper circuits. The company has also completed a toll line from here to Dixon.

VINCENNES, IND.—The New Home Telephone directory, just issued, shows 920 connections in city and country. Another section is being added to the switchboard to accommodate the rapid increase of subscribers. The present cable capacity is fourteen hundred, and the plant can take care of 3,000 connections.

JEFFERSON, IA.—A meeting of all the stockholders of the Greene County Farmers' Mutual Telephone Company has been called at Jefferson on June 27, for the purpose of voting upon the question of incorporating the company under the laws of Iowa. Under the by-laws of the company, a vote of two-thirds of the stockholders is necessary to incorporate, but the sentiment seems very strongly in favor of this step.

ANTRIM, KAN.—The Antrim Mutual Telephone Company, of Antrim, has completed its line into St. John.

CADILLAC, MICH.—The Citizens' Telephone Company has just completed a new line from this city to Elton. The farmers through the territory south of the city for a distance of eight miles are connected with and are a part of the city exchange. The construction crew are at work on the line from this city to Dighton and will have it completed in another week.

DETROIT, MICH.—The Co-Operative Telephone Company will soon complete Independent telephone communication with over 40,000 telephones in the State of Michigan alone, besides numberless others in Illinois, Indiana, Ohio, Pennsylvania and New York. The present line of the company extends from Detroit to Plymouth, Mich., and connects with Northville, Farmington and Novi. The Livingstone Home Telephone Company is running a line from Brighton east to Plymouth. The work will be completed within a week, and then connection will be made with the Co-Operative line.

MANKATO, MINN.— G. A. Hultengren and Dan Williams, the former secretary and the latter treasurer of the Minnesota Valley Farmers' Mutual Telephone Company, have returned from the Twin Cities, where they placed the order for thirty miles of wire for their main trunk line. This order did not include the wire for the party lines, which will require about 500 miles. The poles have already been ordered and they will be set in position immediately upon their arrival. The wire is expected to arrive soon.

LA GRANGE, MO.—The stockholders of the Farmers' Telephone Exchange held a meeting here recently, at which it was decided to charge each stockholder $1.00 per year to defray expenses such as repairing, etc. This company is composed of thirty-four stockholders and fifty-one shares have been taken. The Farmers' Telephone Exchange will be incorporated. Farmers may purchase stock in this company, and in case any stockholder wishes to sell the company will pay the par or actual value of his stock. The committee on switchboard was continued. It was also decided that the two companies which intend to build lines to La Grange be admitted to this company.

LOWVILLE, N. Y.—The Black River Telephone Company has arranged to connect with the Fulton Chain Telephone Company, thus reaching Crystaldale, Chase's Lake, Number Four and Stillwater.

WALTON, N. Y.—The Walton Telephone Exchange and the Hancock Telephone Company have connected their lines midway between Apex and Rock Rift, and now hello Hancock, Apex and Cadosia are being given service. The Hancock Company has been reorganized, with Arthur Pierson as president and general manager. He holds controlling interest in the company.

ATHENS, PA.—The Valley Telephone Company has connected at Wilawanna with a private line running to Ridgebury. Poles have been set from Athens to Milan and service to that point will be opened about July 1. This line will also connect with a private line already built from Smithfield to that point.

PERSONAL

CLEARFIELD, PA.—Ollie Campbell, manager of the Central Pennsylvania Telephone & Supply Company's office at this place, has resigned his position and will move his family to Clearfield, where Mr. Campbell has accepted the position of Superintendent of Construction work for the Huntingdon & Clearfield Telephone Company. Mr. Campbell is to be succeeded by Mr. Kester, of Wilkesbarre.

THE WEEK'S MESSAGES—Concluded.

CRESSON, PA.—J. B. Johnston, general manager of the Cambria County Telephone and Telegraph Company at Cresson, has resigned and has accepted a position with the Johnstown & Pittsburg Long Distance Telephone Company. He will make his headquarters at Greensburg, which will be the center of operations on the proposed line, and will virtually be Superintendent of Construction. As soon as official announcement that the charter has been granted at Harrisburg is received, the contract will be let and will, it is said, contain a clause that the work is to be completed within ninety days and is to be in operation by October 1, at the latest.

PITTSBURG, PA.—Morris W. Mead, who has for many years past been Superintendent of the Bureau of Electricity of the city of Pittsburg, was present at the convention of the New York State Independent Telephone Association at Utica. Mr. Mead expects to soon enter the electrical field as salesman for a prominent company.

New Construction in the Field

MOBILE, ALA.—The Home Telephone Company, of this city, will within the next ninety days instal an entirely new plant, including central station and the city circuits throughout. The contract for the central station plant will be let soon and the poles and wire for the new installation throughout the city have already been ordered. W. H. Bryant is manager of the Home Company. He said that negotiations had been forwarding for some time to this end, and that now everything was in shape for the new work. Bids have been asked for the central office work. The total cost of the improvements is estimated at between $30,000 and $50,000.

CANTON, ILL.—At a meeting of the board of directors of the Canton Home Telephone Company it was decided to purchase the necessary additional equipment and let entracts for the installation of 100 more instruments in the business district.

OSSIAN, IND.—The Rural Telephone Company, connecting with Uniondale, Markle, Sheldon, Zanesville, and having a clientage of over 200 farmers, will come into town and make connections with a number of business houses.

PLAINFIELD, IND.—Work has begun on a new line from Plainfield to Washington, Daviess County, where it will connect with the Home Company. A complete system is being put in, connecting Washington, Plainville, Cornettsville, Epson, Elnora, Sandburn, Becknell, Ragsville, Newberry and Edwardsport. W. H. Bush, president, and B. J. Millis, secretary of the company, say that the rural district will have access to the system throughout the whole of Daviess County, and it will also give all the patrons direct connection with Washington, Vincennes, Terre Haute and Indianapolis.

BURLINGTON, IA.—The Modern Telephone Company will establish an automatic exchange here.

MUSCATINE, GA.—The Mississippi Valley Telephone Company intends to put in a new switchboard, string new cables, and overhaul the entire system here. J. C. Hubinger, president of the company, said that the work of improvement would begin within a few weeks.

PARSONS, KAN.—The list of subscribers to the Chetopa Telephone Company is increasing rapidly, and the company has ordered a new switchboard with a capacity of 300 telephones.

CARO, MICH.—The Moore telephone system is being extended at Vassar and Mayville, and when the new lines are complete about twenty miles of line will have been added to the system and sixty rural subscribers.

IONIA, MICH.—The Independent Telephone Company is putting up a new line through the western part of the township and will extend it into Keene.

JACKSON, MICH.—The Citizens' Telephone Company has stetched a submarine cable from Pleasant View, Clark's Lake, to Eagle Point.

AITKIN, MINN.—In addition to the proposed line to Grand Rapids, the Aitkin Telephone exchange will build one to Nichols, on the north shore of Mille Lacs Lake.

EDGERTON, MINN.—The lines of the Enterprise Telephone Company running northeast of town have become so heavily loaded that the company has found it necessary to run another line in this direction to take care of the steadily increasing business.

PIEDMONT, MO.—The Reynolds Telephone Company is arranging to put in an exchange here. Right of way has been secured for poles and wires.

RED LODGE, MONTANA.—The prospect of the extension of the line of the Montana and Wyoming Telephone Company from Red Lodge to Absarokee is assured. Orders have been placed for the balance of the poles and other materials, and work will be commenced at once. It will take about ten days to complete the extension to Absarokee. The line will be double metallic circuit, with cedar poles. The company means to extend the line from Absarokee to Nye City in the near future.

LINCOLN, NEB.—Colonel C. J. Bills and other members of the Western Union Independent Telephone Company, which is to install a plant in Lincoln, are in Chicago figuring with contractors on putting in the system in this city. Mr. Bills, who is looking after the preliminary work here, says that unless the figures of the contractors come within a certain limit, the company will install the plant itself, though the task would preferably be let out to a firm in this business. Mr. Bills thinks the system will be ready so that service may be given by the first of next year.

ELMIRA, N. Y.—The York State Telephone Company has inaugurated a connecting system between this city and Spencer and now has toll stations at Horseheads, Breesport, Erin, Van Etten and Spencer. M. H. Murphy is manager. The work is being pushed rapidly and there will soon be a connecting link with Ithaca and Binghamton.

FILLMORE, N. Y.—The Fillmore Telephone Company has its new line to Dutch Hill completed. The company also intends to build a line to Houghton soon.

ITHACA, N. Y.—A gang of twenty-five telephone men have commenced the construction of the Salterville-Ithaca telephone line. Poles are being set and the wires strung along the proposed route. The Slaterville-Ithaca line is to be worked in conjunction with the Caroline Rural Telephone Company, with the exchange office at Slaterville Springs. The company has already purchased the switchboards and necessary apparatus for the working of the lines.

LE ROY, N. Y.—Manager Eaton, of the Inter-Ocean Telephone Company, says a sufficient number of subscribers have been secured to extend the line from Le Roy to Roanoke.

LITTLE FALLS, N. Y.—The Independent Telephone companies of Central New York are to be joined together by a large trunk system of telephone wires, stretching from Erie, Pa., to Rutland, Vt. The line will be constructed by the Independent Union Telephone Company, which is composed of stockholders in the leading Independent telephone companies of the State. Manager Clark, of the Home Telephone Company, of Schenectady, has charge of the construction of the line. He was in this city recently and made arrangements for the construction of the line through here. The line is in operation now between Albany and Schenectady and is being constructed into Amsterdam. About seventy poles a day are being erected. At Fonda connection is made with the Glen Company, giving through connection with Johnstown and Gloversville. From Fonda the line goes through Stone Arabia, cutting out Canajoharie and Fort Plain and strikes St. Johnsville, where it will join the Interstate. Canajoharie and Fort Plain will have connections through this system. The new company will rebuild the Interstate's line to this city. From this city to Herkimer the line on the north side of the river, close to the trolley tracks, will be abandoned and a new line will be constructed on the south side of the river. The poles between here and St. Johnsville will also contain private wires for the Interstate's own use. The construction gang will reach this city about July 1 and the entire line will be in operation by August.

PENN YAN, N. Y.—The Penn Yan Telephone Company is extending its line to Dresden.

WALTON, N. Y.—The Walton Telephone Exchange will greatly improve its service in the near future. New supplies have been purchased and an expert electrician engaged to thoroughly overhaul the system.

BELLMONT, OHIO.—The Belmont Telephone Company has decided to build a line across the country from St. Clairsville to Maynard.

UNIONTOWN, PA.—P. A. Johns is building two telephone lines, one from Pritts to Indian Head, to connect with the Tri-State, and the other from Pritts to Trent, to connect with the Somerset County telephone line. Mr. Johns' line will connect Uniontown and Fayette County with Johnstown, Altoona, Cumberland and all places in that section. The line will be completed about June 15.

WESTERLY, R. I.—The Westerly Automatic Telephone Company is putting in poles along the Shore road to Pleasant View. A new switchboard has been ordered.

GANADO, TEXAS.—The local telephone, put in by the Commercial Telephone Company, is nearing completion.

BELMONT, W. VA.—The Belmont Telephone Company will start work stringing new cable at Barnesville. The cable alone will cost nearly $4,000.

TRADE NOTES

W. H. Anderson & Sons, of Detroit, Mich., have issued a pamphlet describing their line of cement working tools.

The Farr Telephone and Construction Supply Company, of Chicago, has gotten out a little folder which briefly describes some of its instruments and gives current prices on construction material.

The Stromberg-Carlson Telephone Manufacturing Company has recently sold switchboards and equipments to the Consolidated Telephone Company of Gridley, Ill., and to the Concord Telephone Company, of Concord, Ill.

The International Telephone Manufacturing Company, of Chicago, has issued a handsomely illustrated bulletin which describes the products of the company. The regular catalogue will be issued some time in the future.

The American Electric Telephone Company, Chicago, Ill., has just issued a new catalogue showing its apparatus as it is built to-day. It contains 128 pages, printed in an original manner, as has always been characteristics of this company.

The American Vitrified Conduit Company has furnished the Keystone Telephone Company, of Philadelphia, with 6,000,000 feet of four multiple 3½-inch special conduit. The Philadelphia installation is but one of many that this company has recently handled.

The Clark Automatic Telephone Switchboard Company, of Providence, R. I., has recently erected and placed in operation a telephone system using its apparatus at Allendale, S. C. Some of the more recent installations of this company include the Reid New Foundland Co., St. Johns, N. F.; the Masurite Explosive Works, Sharon, Pa.; American Steel Hoop Co., Etna, Pa.; the Builders' Iron Foundry, D. & W. Fuse Co., and the Queen Dyeing Co., Providence, R. I.

The W. C. Nagel Electric Company, of Toledo, Ohio, is placing on the market a development of its "Ready" type of reel, which is especially designed to carry wire while stringing house drops. The apparatus is illustrated on page 9 of the advertising section. It is claimed that these reels save not only time and labor in stringing drops, but also save much material, as they keep the two wires used for connecting pole line to subscriber in perfect coils and free from kinks. The company's tandem reels are made in two styles. No 7 has a tension attachment, which prevents the reels from running too fast, while No. 8 is free running.

The Franklin H. Kalbfleisch Company, whose advertisement appears on another page of this issue, has published several pamphlets on storage batteries, and realizing the necessity of having electrolyte free from impurities, were the original manufacturers of pure electrolyte. Their electrolyte is guaranteed to be made only from Sicily brimstone, sulphuric acid and to conform in all respects with the requirements for storage batteries, of all makes, either for central station, telephone exchange work, electric vehicles, or any other uses to which storage batteries are put. They are also large manufacturers of distilled water, to be used in diluting, and make a specialty of these articles, as well as standard battery solutions and chromate salts.

The Eureka Electric Company, of Chicago, has issued a new art catlogue which is a striking example of what can be done with fine half-tones and first-class paper. The catalogue was issued under the direction of H. P. Didriksen, sales manager of the Eureka Company. It contains rich half-tone illustrations of the instruments and sundries which the company handles. The pictures are supplemented by pithy descriptions which tell all about the apparatus in a few well-chosen words. Exactly the kind of descriptions that a busy man likes to read. The company's transmitter and receiver are described quite fully and enough drawings are shown with each of them to give anyone an excellent idea of their construction.

Quite a little treatise is written in the catalogue on the magneto that the company puts out. The good points of this company's generator are not alone touched on, but the first elements of generator design have received attention. In the rear of the catalogue has been placed a compilation of diagrams of some of the company's circuits and telephones, which should be of value to telephone men generally. Every telephone man should have this catalogue.

The Swedish-American Telephone Company has recently closed contracts with the following telephone companies for complete equipment: The Rural Union Telephone Company, at Livermore, Ia., with exchanges at Livermore, Humbolt, Bode, Harding, Rutland and Pioneer, Ia.; Dedham Telephone Company, Dedham, Ia.; People's Mutual Telephone Company, Latimer, Ia.; Golden Rod Telephone Company, Osceola, Neb.; M. L. Reynolds Telephone Company, Delton, Wis.; J. A. Murray, North Freedom, Wis.; Farmers' and Merchants' Telephone Company, Runnells, Ia.; Rowan Rural Telephone Company, Rowan, Ia.; Auburn Telephone Company, Auburn, Neb.; West Lawn Telephone Company, Leeton, Mo.; Interstate Telephone Company, Modale, Ia.; Peet & Co., Swea City, Ia.; Brown Supply Co., Coffeyville, Kan.; Farmers' Mutual Telephone Company, Hepburn, Ia.; Armstrong Telephone Company, Yatesboro, Pa.; Butternut Valley Telephone Company, New Berlin, N. Y.; D. H. Holt, Bronson, Kan.; Judson Milling Co., Judson, Ind.; Wilsonville Telephone Company, Stockport Ia.; Epworth Rural Telephone Company, Cleghorn, Ia.; Arion Telephone Company, Arion, Ia.; Osmond Telephone Company, Osmond, Neb.; Potosi Telephone Company, Potosi, Mo.; Landessville Mutual Telephone Company, Landessville, Ind.; Kilbourne Telephone Company, Kilbourne, Wis.; Pierson Telephone Company, Pierson, Ia.; Rector Co-operative Telephone Company, Rector, Ark.; La Fontaine Telephone Company, La Fontaine, Ind.; Orange Mutual Telephone Company, Orange, Ind.; Viborg & Centerpoint Telephone Company, Viborg, S. D.; Tracy Telephone Company, Bussey, Ia.; New Richmond Telephone Company, New Richmond, Ind.; Sharpesville Telephone Company, Sharpesville, Ind.; Lincoln Mutual Telephone Company, Stuart, Ia.; Cherokee Mill and Elevator Co., Cherokee, Kan.; Deer Creek Co-operative Telephone Company, Deer Creek, Ind.; Camden Telephone Company, Camden, Ind.; Burrows Telephone Association, Burrows, Ind.; Seymour Telephone Company, Seymour, Ill.; Roseville Telephone Company, Roseville, Ill.; Teton Telephone Company, St. Anthony, Idaho; West Bend Telephone Company, West Bend, Ia.; Arlington Telephone Company, Arlington, Ind.; Citizens' Telephone Company, Murraysville, W. Va.; Prairie City Telephone Company, Prairie City, Ia.; Mitchellville Telephone Company, Mitchellville, Ia.; Bedford Co-operative Telephone Company, Bedford, Pa.

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

THE NORTH STAR TELEPHONE COMPANY, of Mountain Lake, Minn., offers $10,000 of its stock for sale, at par; $100 a share. At present paying 10 per cent. dividends. Address NORTH STAR TELEPHONE CO., Mountain Lake, Minn.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

A BELL MANAGER wants position as manager or assistant with first-class Independent company. Will be at liberty July 1st. Address BOX 58, American Telephone Journal, New York.

POSITION as manager or superintendent of exchange, 200 to 300 lines; five years' experience on board, toll lines and construction work, grounded or metallic; aged 38; married, sober, industrious and reliable. Address A. W. Cripps, Harrison, Ark.

POSITION AS TROUBLEMAN; have had seven years' experience as local and long distance telephone troubleman, and also fire alarm troubleman; Minnesota or Dakota preferred. Address BOX 50, care The American Telephone Journal, New York.

WIRE CHIEF wanted immediately for central-energy plant; none but first-class men need apply. Address Jackson Home Telephone Company, Jackson, Tenn.

The American Telephone Journal

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PROCEEDINGS OF THE NATIONAL TELEPHONE ASSOCIATION

THE seventh annual convention of the Independent Telephone Association of the United States, opened on June 24, at the Auditorium Hotel, Chicago, when President J. H. Thomas called to order the 200 members who were present. A business-like silence greeted his words of welcome, and the program of the day commenced.

Owing to a conflicting arrangement made by the hotel management an adjournment was agreed upon for four o'clock, and to facilitate the consummation of the business at hand, the Mayor's address and Mr. Sheerin's reply were dispensed with.

Judge Thomas rose, for the last time as its president, to address the association. He spoke almost pathetically of the pleasure it had afforded him to lead the organization through its most troublous times, and of the success that enabled him to resign his chair with a feeling of safety. Hearty applause was accorded the paper which he read, as he outlined the years of toil and the thousands of dollars that the association's patent victories have cost.

On request of Hon. C. E. Hull, the reading of his paper was postponed until the second day. Mr. Hugh Dougherty arose to read the report of the Litigation Committee. After a spirited and lengthy explanation of the proceedings of the committee, their labors and their achievements, an itemized account of the receipts and expenditures of the fiscal year followed. The statement showed receipts of $50,127.12 and a present balance in the treasury of $1,900. On motion of L. A. Frazee and second of C. E. Tarte, the report was adopted in full and a vote of thanks unanimously extended to the committee. Mr. E. B. Fisher further thanked the committee in behalf of the association, dwelling with some eloquence on the disinterested energy that has been displayed by the members in charge of the patent litigation. "Were it not for the noble efforts of our litigation committee, we should not be here to-day as an Independent organization," said Mr. Fisher. "The life of our organization, yes, the life of our business interests, was in the hands of the Berliner suit, which our committee won for us after years of constant and uninterupted labors."

Professor J. C. Kelsey, of Purdue University, next read a paper on "The Telephone in the Technical Schools," and won abundant applause by his facetious, yet scholarly, exposition of the subject. J. S. Ballamy, who was to address the convention, sent his regrets, as business exigencies required his presence at home.

Hon S. P. Sheerin, of Indianapolis, then arose and requested the floor. "I wish to propose an amendment to our constitution," said Mr. Sheerin. "I wish to propose an entire reconstruction of our present system. The day of patent danger is over, but we must perpetuate the body that has made this great victory possible. Heretofore we have had as members the firms and corporations who are conducting Independent telephone enterprises. I want to propose that the individuals be enrolled as members, and not the companies that they represent. In view of this desire I have drawn up, with the able co-operation of many of our most prominent delegates, an entirely new construction and by-laws, which shall leave nothing but the name of our organization unchanged. By fostering an interest in the association among the younger men in the telephone industry, we can place this organization on a footing of equality with the associations of other mechanical branches. Without this interest, our life is destined to be short."

Mr. Sheerin then read the entire draft of the proposed constitution and moved that it be adopted. Colonel H. C. Young, of Columbia, Pa., seconded the motion, and by a rising vote it was carried without opposition.

President Thomas then read a letter from the United States Census Bureau asking the telephone men to communicate all figures and particulars of their industry to the government for compilation. Secretary J. B. Ware, in an address, dwelt upon the importance of bringing telephone statistics before the public for the financial benefit to be derived from publicity.

Letters from President Francis and Secretary Kulp, of the Louisiana Purchase Exposition, were then read, in which the association was invited to hold its next convention in St. Louis in September, 1904, during "electrical week." Professor Goldsborough, head of the electrical department of the exposition, indorsed the request in person, and offered the hospitality of the Missouri metropolis to the telephone men. S. E. Wayland moved that the invitation be accepted. E. B. Fisher seconded the motion, and it was unanimously adopted. The next convention will, therefore, be held in St. Louis.

The entertainment committee explained that arrangements had been completed for a tally-ho tour of the South Parks and an evening at Sans Souci Park, a famous Chicago vaudeville and amusement resort. The meeting then adjourned for the day.

SECOND DAY'S SESSION.

THE convention began its second day with a paper on "The Value of Good Work," read by Mr. C. E. Tarte, of Grand Rapids, who demonstrated at great length and with minuteness the economy which lies in high class construction and employment of efficient labor. Mr. F. A. Demarest, of Trenton, next spoke on "Eastern Telephone Development," reading from his copious data facts from the marvelous growth of the Independent telephony in the Atlantic States. Messrs. Hull and Bellamy telegraphed their regrets and announced that they could not be present to read the papers which they had prepared for the meeting. Leroy W. Stanton, of Cleveland, consented to deliver an impromptu address on "Economy in Operation," expounding with the aid of figures and diagrams how waste cables and party line connections could be utilized to a profitable end.

The chairman called for new business, and Mr. Jerome Penn, of Washington Court House, Ohio, offered the following resolution: Whereas, it appears from the court records of Cook County, Illinois, as well as through charges duly filed by a member of this association, which is further confirmed by admissions from the offending company, that the controlling interest in the Kellogg Switchboard and Supply Company, a member of this association, was sold on or about Jan. 4, 1902, to Messrs. Fish and Barton, and others, representing large interests in both the American Telephone and Telegraph Company and the Western Electric Company; and whereas, the purchasers of the said stock have been and now are either directly or indirectly prosecuting and directing the competition on both the operating and manufacturing branches of the Independent telephone business, and doing everything within their power to harass and hinder the Independent operators and manufacturers by methods not recognized, nor condoned by fair principle, and whereas, the Bell-Kellogg combination has seen fit to resort to a most detestable subterfuge in an apparent effort to embarrass and retard the progress of certain Independent telephone buyers, by reason of its controlling the factory from which these unfortunate buyers purchased their equipment, and, whereas, the deception practiced by the said Bell-Kellogg combination in concealing the true condition of affairs, and the misrepresentations under which business has been secured from the Independent purchasers, is sufficient cause for condemnation, therefore, be it

Resolved, That the integrity of the so-called Bell-Kellogg combination in its present status as relates to the Independent telephone interests stands impeached, and be it further

Resolved, That it is the sense of this meeting that all Independent telephone buyers refrain from encouraging or sustaining the so-called combination, and it is further

Resolved, That the membership of the aforesaid Bell-Kellogg combination in this association be cancelled and that the offender be summarily expelled from this body.

The resolution on motion was indefinitely tabled.

Mr. J. G. Ihmsen then in a pretty speech presented to Judge Thomas a watch and fob, a token of esteem from a few personal friends. Mr. Thomas acknowledged the gift in an address of thanks. Then he called for nomination of officers. H. D. Critchfield arose, and in a long eulogium offered Hugh Dougherty, vice-president of the Association, for president. Mr. Sheerin immediately moved that Mr. Dougherty be elected by acclamation. The motion was unanimously voted, and the secretary instructed to cast the ballot of the Convention for Mr. Dougherty. C. W. Kline, of Hazelton, Pa., was elected vice-president in a similar manner. H. B. McMeal and Frank G. Jones were nominated to the office of secretary-treasurer. Mr. Jones was elected by ballot.

A committee was appointed to offer nominations for members of the advisory committee. The following names were selected by them and elected without a dissenting vote: W. E. Goldsborough, Lafayette, Ind.; H. D. Critchfield, Chicago; J. G. Ihmsen, Chicago; Thomas Finucane, Rochester; W. E. Doolittle, Lafayette; C. E. Tarte, Grand Rapids, Mich.; E. H. Moulton, Minneapolis, Minn.; A. L. Tetu, Louisville, Ky., and E. E. Clement, Washington, D. C.

After voting resolutions of thanks to the entertainment committee, and to the manufacturers who have helped to make the Chicago trip a pleasant one for the delegates, and to the retiring officers, the convention adjourned.

THE TELEPHONE MAKERS

Manufacturers and supply men were much in evidence on both days of the convention. Many elaborate exhibits were made. Among the companies represented and their representatives were the following:

Pittsburgh & Lake Superior Iron Co. Cedar posts. Represented by Herbert W. Reader.

William Murdock & Co., Chelsea, Mass. Transmitters and receivers. Represented by William Murdock.

International Telephone Mfg. Co. Represented by Henry Shafer, William E. McCormick, and Frank L. Middleton.

Gordon Battery Co. Represented by Deenis.

Chicago Telephone Supply Co. Represented by George A. Briggs and Stanley Duvall.

Turner Brass Works. Represented by T. R. Ferris, F. C. Binkley and P. Henderson.

A. P. Hopkins Co. Cedar poles. Represented by Millard Hopkins.

Central Electric and Telephone Co., St. Louis. Represented by its president, James E. Cumming.

McDermid Mfg. Co. Represented by Charles L. Burlingham.

National Cable & Wire Co., Pittsburgh. Represented by Morris W. Mead.

Swedish-American Telephone Mfg. Co. Represented by E. B. Voershiner, W. F. Macklin and A. V. Overshiner.

Farr Telephone & Construction Supply Co. Represented by its president, Charles W. Farr.

Holtzer-Cabot Electric Co. Represented by E. R. Harding.

American Electric Fuse Co. Represented by Frank G. Jones and J. E. Kenney.

Jno. A. Roebling's Sons Co. Represented by George C. Bailey, W. H. Slingluff, A. G. Tingley, A. M. Whaley and W. P. Bowman.

Harvard Electric Co. Represented by Frederick Greer.

Williams-Abbot Electric Co. Represented by L. Sands.

Williams Electric Co., Cleveland. Represented by Joseph Williams.

Standard Underground Cable Co. Represented by its Western manager, J. R. Wiley.

Hubbard & Co., Pittsburgh. Represented by C. Seyler.

Hipwell Mfg. Co., Alleghany, Pa. Represented by Henry Hipwell, its president.

McRoy Conduit Works. Represented by its general sales manager, "Kirk" Kirkpatrick.

Warner Electric Co., Muncie, Ind. Represented by E. C. Warner.

Moon Mfg. Co. Terminals. Represented by T. H. Wood.

Stromberg-Carlson Telephone Mfg. Co. Represented by James J. Nate and R. B. Tyler.

F. Bissel & Co., Toledo, O. Represented by Messrs. Hamilton and Bissel.

Illinois Electric Co. Represented by its president and secretary, Messrs. Herly and Cushing.

Electric Appliance Co. Represented by Samuel Dinsmore.

Clark Automatic Telephone Switchboard Co. Represented by J. L. Putnam.

Baker & Co., Newark, N. J. An assortment of platinum rivets for contact points in telephones. Represented by J. J. Lowthian.

The Allen-Hussey Co., Chicago. A full line of interior telephones and interior systems. Represented by A. R. Hussey.

The New Haven Novelty Machine Co., New Haven, Conn. Cable sleeves. Represented by H. J. Minhinnick and H. Grant Thompson.

Eureka Electric Co., Chicago. Represented by I. J. Kusel, P. K. Diedricksen, Paul Gardner and D. C. Canmann.

Automatic Electric Co., Chicago. Represented by J. F. Crook, H. D. Critchfield and Sanford Harris.

Sterling Electric Co., Lafayette, Ind. Exhibit of general telephone apparatus. Represented by H. F. Doolittle, E. Shelby and F E. Rotchka.

North Electric Co., Cleveland, Ohio. Complete line of telephone apparatus and switchboards. Represented by C. H. North, F. F. Sapp and L. G. Bowman.

Monarch Telephone Mfg. Co., Chicago. A line of general telephone appliances and parts as well as complete systems. Represented by E. E. Yaxley, J. C. Hubacker and Walter H. Trimm.

Chicago Telephone Holder Co., Chicago. A line of handy telephone holders. Represented by F. W. Pardee.

Frank B. Cook, Chicago. A line of telephone protectors. Represented by Frank B. Cook.

Crawfordsville Wire and Nail Co., Chicago. Telephone wire. Represented by H. E. Cobb and Richard Schweitzer.

The Miller Anchor Co., Norwalk, Ohio. The Miller anchor. Represented by G. H. Miller.

Ohio Glass Co., Chicago. Glass insulators. Represented by Charles O. Hutch.

Thomas E. Clark Wireless T. & T. Co., Detroit, Mich. Wireless telegraph apparatus. Represented by Ackland Stiling.

Francis Beidler & Co., Chicago. Cedar posts. Represented by M. B. Cross.

Valentine-Clark Co., Chicago. Cedar posts. Represented by Ernest Clark and F. L. McGillan.

Maltby Lumber Co., Bay City, Mich. Telephone poles. Represented by I. A. Maltby.

Carney Bros. & Co., Chicago. Cedar poles. Represented by W. J. Carney and E. E. Kaufman.

Lindsley Bros. Co., Chicago and Spokane. Cedar poles. Represented by George Lindsley and E. A. Lindsley.

American Electric Telephone Co. Represented by P. C. Burns, J. G. Ihmsen, John H. Reid and Geo. Speed.

REPORT OF PATENT LITIGATION COMMITTEE

By Hugh Dougherty.

To give you a simple statement of figures showing amount of money received and paid out in the matter of defending your interest against suits brought by the Bell Telephone Company against Independent operators would scarcely be satisfactory, and yet I must be to some extent, brief in general details.

In the month of May, 1897, there was a meeting of a few persons representing telephone interests in Ohio and Indiana at Fort Wayne, which resulted in the meeting being called at Chicago in the month of June of the same year, when your association was formed and Hon. James M. Thomas was elected president of the association and has been re-elected each succeeding year since that time.

The first steps that were taken looking to some protection of your interests against patent suits by the Bell Telephone Company was at the next meeting while in the city of Detroit. There was professed great interest in that city in Independent telephony. There had been much money spent and an exchange well along under construction, and of course it was proper and right that the people of Detroit should be interested in this association.

It developed before the time of the meeting that the persons in charge of the Detroit exchange were intending to capture the convention and control the officers that they might turn the convention to their selfish interests. This they failed in, and subsequent events have proven that those who secured their defeat acted wisely, because they soon thereafter sold out to the Bell and that there was no original honest purpose to build a great Independent system in this country by them.

The fight in the convention at Detroit developed the fact through the speeches of lawyers who argued in behalf of the people of Detroit that, should your association take up the question of defending the suits brought in Boston against the National Telephone Company and the Century Telephone Company, that every contributor to your association would be a party to the suit, and the advisory board wisely concluded that while these suits must be defended through the infleunce and machinery of your association, yet the record of such defense or contributions must be kept and handled so as to entirely lose the chain that would lead up to the discovery of how and by whom the defenses were made, for if the contributors had been exposed, it was believed by the best legal authority that should the Bell win the first suit, an injunction would lie against each one of the contributors, otherwise they might insist that they had not had their day in court, and the Bell would have to continue their individual suits against each company or individual user of telephones.

This made it extremely embarrassing to the advisory board and the committee on litigation, and gave an opportunity to the jealous-hearted and suspicious-minded members to censure the advisory board and executive officers of your association, because of a lack of knowledge as to what was being done, but for all that, I am very proud of the fact that the confidence in the advisory board and executive officers was sufficient to keep them in office until the end of the litigation has been reached and the investments represented by this association have been made safe.

While I feel it my duty to say that the members of the advisory board and the executive officers as a whole, or as individuals, never faltered in their efforts to raise money, gather evidence and do everything necessary to put in a proper defense against these suits, yet I want to especially mention that Judge Thomas, the president of your association, from the beginning up to this time, not only gave up every moment of time necessary, but practically abandoned his business and for months his entire time was given, and the best part of it is when he gave his time he gave skill and ability in your behalf, which as a whole has been worth to you, representing the entire Independent system of this country, millions of dollars.

At Detroit his salary was fixed as president of the association, which was not paid his because of the fact that it would hazard your interests, yet that salary was intended to pay him for his efforts and skill in your behalf, but when it was found that money could not be secured to scarcely furnish means enough to keep the litigation going, Judge Thomas very generously declined to allow any money to be paid him for his services and time, and would not allow the matter to be considered until every dollar was provided for covering the litigation fund.

I now insist it is your duty as a convention, not to adjourn until means be provided so that he be paid that which is justly due him, and if you do less than this, you will not only have failed to do your duty toward him, but will have robbed him and his family of money due him for services and time rendered which has been of vast benefit to you.

The first litigation committee was apopinted at the Detroit meeting of the National Association, which was composed of Judge J. M. Thomas, Hon. H. D. Critchfield, of Ohio, and Judge Savage, of Pennsylvania. At the time this committee was appointed there were two suits pending in the United States Circuit Court at Boston, which were defended by E. P. Payson, an attorney of ability, but Mr. Payson found his client in the hot-bed of the Bell Telephone Company interests without means to defend itself. The president and other officers of the defendant company had abandoned it all, but its treasurer, J. H. Leatherbee, had employed Mr. Payson to make the defense, and they were entirely unable to get together the evidence and pay expert witnesses so that the litigation committee commenced at once to make such arrangements, and to have money put in the hands of Payson from unknown sources, that he could use it in procuring evidence. This enabled him and Judge Taylor, who was afterward associated with Payson by your committee, to defeat the Bell Telephone Company in the United States Circuit Court and then was appealed by the Bell to the United States Court of Appeals, where they were again defeated, and they not having appealed to the United States Supreme Court up to this time, settles the question.

It was partially agreed that Hon. Chas. H. Aldrich, of Chicago, be employed prior to the time Judge Taylor was employed in the case, but this plan was changed to the satisfaction of Mr. Aldrich, and the amount of money to be paid him, $4,000, was then changed to E. P. Payson, of Boston, attorney, and paid over to him.

At our next meeting while in the city of Chicago there was formed a new deal by which Mr. James B. Hoge, of Cleveland, was made a trustee of the fund at the request of Judge Thomas, and subsequently he was superseded by Hon. S. P. Sheerin, of Indianapolis. In the meantime, Hon. R. S. Taylor, of Fort Wayne, was employed to act in conjunction with E. P. Payson, when Judge Thomas and myself were appointed at a called meeting of the advisory board at Cleveland to take charge of the management of the case.

At this time funds had been exhausted and the expert witnesses, court costs, briefs, etc., had to be paid for and money was raised, when Judge Thomas and I proceeded to Boston, where we went to aid Payson in whatever way we could to prosecute the case and furnish whatever money was necessary to pay the expenses. We found Payson absent and upon inquiry traced him to Moosehead Lake, in Maine, where we proceeded, when we found him in a retired place with the room full of books and papers, preparing himself for the case to be held before the Circuit Court in Boston. We paid him $2,000 at this time, which gave him new courage and energy, although he was not lacking in interest or industry when we reached him.

I will not undertake to mention the trips that were made by Judge Thomas and myself, but there were a considerable number, covering nearly the entire country, and I have personal knowledge that Judge Thomas made a great many trips and spent a great deal of time with the former committee on litigation before I became active with him. He also attended court when the arguments of the case were made and did every thing he could to get such influences before the court that would show the importance of the case on our side.

The labor done, however, by Judge Thomas and those associated with him was not all for the Berliner patent in Boston, but another case nearly equal in importance, but not quite so vital if lost, known as the Carty case.

The litigation in this case was largely carried on during the period which Judge Thomas and myself were in charge of the litigation for your association. This required quite as much time in gathering evidence and looking after the defenses, and as much money to carry it on as did the Berliner case, as the evidence had to be gathered from people throughout the entire United States that had been in the services of the Bell Company of Chicago, and knew of the prior use of the Carty patent. These witnesses had been scattered all over the country, having left the employ of the Bell Telephone Company, of Chicago, and had to be looked up, depositions taken and witnesses brought into court from long distances and at an immense expense.

In this case the Bell Telephone Company had won the case against the Independents, having commenced suit at Pittsburgh against the Milheim Telephone Company, which was a very small company. After the case had been commenced, it was alleged they bought out the defendant company and directed the litigation secretly on both sides, and of course got a judgment against the Independents for infringement. In this case we employed C. C. Bulkley, of Chicago, and Hon. R. S. Taylor, of Fort Wayne. After the bill had obtained judgment the Bell company undertook to enjoin the Independents from the use of the Carty patent under their judgment. Through great effort and loyal ability they were thwarted in this, and their judgment set aside because it was obtained through fraud.

In this case, everything has been paid, including the argument in the case now before the U. S. Court of Appeals, which is not decided, but as a committee we feel confident that the U. S. Court of Appeals will decide in our favor.

It would require too much time and space to go into detail as to what was done by your committee in gathering together the money at times when it seemed almost impossible to further retain the confidence of the association, but it is sufficient to say that the committee had to go into bank at one time and borrow a sum of money on its own credit in order that the evidence be gathered in time for the case.

At another time, Judge Thomas and myself gave a personal guarantee to the amount of $4,000 to the attorneys to keep the case going. In addition to this fact, the suit had been won at Boston in the U. S. Circuit Court and while pending on an appeal Mr. J. H. Leatherbee, treasurer of the company, who is named as defendant, made a demand on us for $10,000, and if not paid promptly he would refuse to allow the suit to be defended in the U. S. Court of Appeals.

Through the tact and skill of Judge Thomas, the name of the electrician of the company defendant at the time the suit was commenced was found, looked up and his consent secured to make him the defendant instead of the treasurer, who had refused to stand, unless we paid him the $10,000.

After we had these obligations out for which we were personally liable, the question of fee for Judge Taylor for the final argument of the Carty case came up and we were compelled to say to him that we could not personally guarantee his fee, when he very generously said all he would require of us was that we would do our best to see that he was paid and he has been paid.

It is difficult to have you understand why large sums were paid out when you were not present through the entire transaction and could not see the immense amount of work necessary to do, and was done to cover these expenses. We not being permitted to give a detailed statement of what had been done with their money, but I am sure now a full and complete statement and an expose of everything that has been done cannot help but make the Independent telephone people of the United States feel that in Judge Thomas they have had a true and tried friend and whose acts have always been unselfish and wise.

Following I give you a statement of receipts and expenditures, not one dollar of which has ever been paid to any officer of your association, except Mr. Carr, of Durham, South Carolina, who forcibly retained what was originally allowed for salary for him as treasurer out of money that went into his hands as treasurer of the association. No other member has felt he was entitled to take any money for his services as an officer, or for his time given; no other person was ever paid any money except upon a voucher properly signed by the committee on litigation or the president and secretary.

I now submit to you in detail a statement of receipts and expenditures covering the entire time from the beginning of your association up to the present time, which was collected for the purpose of carrying on the litigation. The expenses for dues of the association is a matter entirely of a different character and not in the least included with the fees collected or expended.

I am pleased to call your attention to the generous contributions by the manufacturers as well as the operators.

STATEMENT OF RECEIPTS AND DISBURSEMENTS IN LITIGATION CASES

Receipts.

C. A. Aldrich	$2,000.00
J. M. Thomas	1,000.00
Aldrich & Thomas	1,000.00
United States Telephone Company	750.00
Kellogg	1,000.00
P. Burns	500.00
New Telephone Company	200.00
New Long Distance Telephone Company	200.00
United Telephone Company	50.00
Home Telephone Company	50.00
Ed. L. Barber	250.00
P. Burns	300.00
Geo. W. Beers	500.00
Citizens' Telephone Company, Muskegon	150.00
Citizens' Telephone Company, Grand Rapids	200.00
Cuyahoga and United States Telephone Companies	1,000.00
New Telephone Company, Indianapolis	500.00
New Long Distance Telephone Company	500.00
Sterling Electric Company	500.00
Kellogg Switchboard and Supply Company	1,000.00
American Electric Company	1,000.00
Citizens' Telephone Company, Grand Rapids	300.00
Holtzer-Cabot Electric Company	500.00
Citizens' Telephone Company, Columbus, Ohio	250.00
Federal Telephone Company, Cleveland, Ohio	250.00
U. S. Telephone Company, Cleveland, Ohio	250.00
Cuyahoga Telephone Company, Cleveland, Ohio	250.00
Anthracite Telephone Company, Hazleton, Pa	50.00
People's Telephone Company, Wilkesbarre, Pa	100.00
Lackawanna Telephone Company, Scranton, Pa	100.00
United Telephone Company, Bluffton, Ind	200.00
New Long Distance Telephone Company, Indianapolis	300.00
Kellogg Switchboard and Supply Company	1,000.00
American Electric Telephone Company	1,000.00
Citizens' Telephone Company, Ashland, Ky	50.00
Lawrence Telephone Company, Ironton, Ohio	50.00
Cedar Rapids and Marion Telephone Company	100.00

Pittsburgh and Alleghany Telephone Company, Maryland Telephone and Telegraph Company	500.00
Lorane Savings and Banking Company, loan	2,530.00
Small companies in Pennsylvania	153.50
Anthracite Telephone Company, Hazleton, Pa	50.00
People's Telephone Company, Wilkesbarre, Pa	100.00
Lackawanna Telephone Company, Scranton, Pa	100.00
Holtzer-Cabot Electric Co	300.00
Central Construction Company, Wauseon, Ohio	250.00
Slate Belt Telephone and Telegraph Company, Nazareth, Pa	16.50
Millville Telephone Company	1.00
Lebanon Telephone Company, Indiana	10.00
Standard Telephone and Telegraph Company, Philadelphia	10.25
Home Telephone Company, Crawfordsville, Ind	45.00
United Telephone Company, Bluffton, Ind	100.00
Rochester Telephone Company, Indiana	30.00
Stromberg-Carlson Telephone Manufacturing Company	2,500.00
Kellogg Switchboard and Supply Company	2,500.00
Chicago Telephone and Supply Company	250.00
American Electric Telephone Company	2,500.00
Farr Telephone Construction and Supply Company	200.00
James B. Hoge, Trustee for Ohio	4,000.00
Fulton Telephone Company, Covault, Pa	1.90
Twin City Telephone Company, Minneapolis	100.00
Ladoga Telephone Company, Indiana	12.00
Darlington Telephone Company, Indiana	20.00
Newton Telephone Company, Indiana	9.60
Shannondale Telephone Company, Indiana	10.70
Indiana Telephone Company, Indiana-Pennsylvania	17.50
Roachdale Union Telephone Company, Indiana	10.70
Waveland Telephone Company, Indiana	15.00
Forest Telephone and Telegraph Company, Marionville, Pa	5.20
Bloomington Telephone Company, Indiana	25.00
Sterling Electric Company, Lafayette, Ind	1,250.00
Rochester Telephone Company, Indiana	15.00
National Telephone and Telegraph Company, Fort Wayne, Ind	125.00
Tipton Telephone Company, Indiana	42.84
Wabash Telephone Company, Indiana	51.33
Danville Mutual Telephone Company	69.75
S. Morrison Telephone Company, Greenfield, Ind	67.50
Greencastle Telephone Company, Indiana	52.50
Advance Telephone Company, Advance, Indiana	13.50
United Telephone Company, Bluffton, Ind	161.25
Home Telephone Company, Richmond, Ind	200.00
Lebanon Telephone Company, Indiana	20.00
Lafayette Telephone Company	195.00
Franklin Telephone Company, Indiana	33.75
Indiana Mutual Telephone Association	398.35
W. H. Durin, Cedar Rapids, Iowa	130.00
Julius Andrae & Sons, Milwaukee	25.00
F. Bissel & Co., Toledo, Ohio	25.00
West Michigan Telephone Company, Allegan, Mich	10.00
New Telephone Company, Indianapolis	600.00
New Long Distance Telephone Company, Indianapolis	90.00
Martinsville Telephone Company, Indiana	52.00
Union Telephone Company, Alma, Mich	150.00
Citizens' Telephone Company, Columbus, Ind	58.00
Sumter Telephone Mfg. Co., Sumter, South Carolina	100.00
Kellogg Switchboard and Supply Company	1,000.00
Central Electric Company, Chicago	125.00
Electric Appliance Company	125.00
International Telephone Mfg. Co	100.00
Illinois Electric Telephone Company, Chicago	50.00
Menominee Electric Mfg. Co., Michigan	100.00
Telephone Magazine, Chicago	25.00
Fred Deland, Pittsburgh	100.00
Vought-Berger Co., Lacrosse, Wis	25.00
F. Bissel Co., Toledo, Ohio	25.00
Valley Telephone Company, Saginaw, Mich	75.00
Sterling Electric Company, Lafayette, Ind	250.00
Monroe County Telephone Company, Dundee, Mich	5.00
W. G. Nagel Electric Company, Toledo, Ohio	50.00
Swedish-American Telephone Company, Chicago	125.00
Citizens' Telephone Company, Muskegon, Mich	150.00
Telephony Publishing Company, Chicago	50.00
Kinloch Long Distance Telephone Company, St. Louis	50.00
Louisiana Telephone Company, Louisiana, Mo	25.00
Kirksville Telephone Company, Kirksville, Mo	20.00
Macon Telephone Company, Macon, Mo	12.50
Palmyra Telephone Company, Palmyra, Mo	10.00
DeSoto Telephone Company, DeSoto, Mo	5.00
Navada Telephone Company, Navada, Mo	5.00
Livingston Home Telephone Company, Howell, Mich	25.00
Kinloch Telephone Company, St. Louis, Mo	200.00
Louisville Home Telephone Company, Louisville, Ky	500.00
Automatic Electric Company, Chicago	2,500.00
Frontier Telephone Company, Buffalo	250.00
F. Bissel Company, Toledo, Ohio	50.00
Standard Underground Cable Company, Pittsburgh	250.00
Sumter Telephone Mfg. Co., Sumter, South Carolina	100.00
New Long Distance Telephone Company, Indianapolis	75.00
Kellogg Switchboard and Supply Company	340.00
United Telephone Company, Bluffton, Ind	100.00
Greencastle Telephone Company, Indiana	15.00
New Telephone Company, Indianapolis	75.00
New Long Distance Telephone Company, Indianapolis	25.00
New Telephone Company, Indianapolis	25.00
North Electric Company	1,000.00
Stromberg-Carlson Telephone Mfg. Co	2,000.00
American Electric Telephone Company	1,250.00
Kellogg Switchboard and Supply Company	660.00
Hugh Dougherty	220.00
Kellogg	250.00
Total receipts	$50,127.12

Disbursements.

E. P. Payson, Attorney, Boston, Mass	$2,000.00
E. P. Payson, Attorney, Boston, Mass	1,000.00
E. P. Payson, Attorney, Boston, Mass	1,000.00
E. P. Payson, Attorney, Boston, Mass	2,000.00
R. S. Taylor, Attorney	750.00
J. M. Thomas, expenses to Boston	92.16
Hugh Dougherty, expenses to Boston	87.84
R. S. Taylor, Attorney, by Hoge	1,220.00
C. C. Bulkley, Attorney	6,107.49
R. S. Taylor, Attorney	4,014.85
J. W. Brennen	1,800.20
Lorane Savings and Banking Company, balance on note	1,080.00
Interest on same	16.20
Interest on above note, postage and telegram	89.59
Western Union Telegraph Company	18.02
Postal Telegraph Company	2.00
R. S. Taylor, Attorney, expenses in Berliner case	522.60
C. C. Bulkley, services Carty patent case	5,000.00
J. W. Brennen, services Carty patent case	600.76
E. P. Payson, Attorney, fee Berliner case	4,000.00
E. P. Payson, Attorney, expenses	1,100.00
S. P. Sheerin, expenses	1.81
C. C. Bulkley, services Carty case	1,000.00
R. S. Taylor, services Carty case	1,500.00
E. P. Payson, expenses Berliner case	231.89
J. W. Brennen, services in Carty case	50.00
J. W. Brennen, services in Carty case	115.00
Exchange on draft	.20
R. S. Taylor, services Carty case	1,000.00
R. S. Taylor, expenses Carty case	272.41
Hugh Dougherty, expenses Washington Boston and return	31.00
J. M. Thomas, expenses New York to Boston and return	19.50
R. S. Taylor, expenses Berliner case	286.18
J. B. Ware, expenses	52.95
J. M. Thomas, expenses	41.40
C. C. Bulkley, services in Carty case	1,000.00
R. S. Taylor, services in Berliner case	2,000.00
E. P. Payson, copies of Berliner decision	20.00
J. B. Ware, expenses	32.08
J. M. Thomas, hotel and travelling expenses	303.00
Hugh Dougherty, hotel and travelling expenses	155.25
E. P. Payson, Attorney, Berliner case	2,500.00
E. P. Payson, Attorney, Berliner case	1,000.00
C. C. Bulkley, services and expenses in Carty case	475.00
E. P. Payson, balance in full for services Berliner case	500.00
Jennie McFall, services as stenographer	25.00
J. B. Ware, expenses	40.00
C. C. Bulkley, Carty case	1,000.00
C. C. Bulkley, in full	3,250.00
F. W. Dunbar, in full for services as expert	660.00
Balance in treasury, June 23, 1903	62.74
	$50,127.12

INTERSTATE CONVENTION DATE FIXED

At a Committee Meeting held in Chicago on Thursday, it was decided to call the Next Annual Convention of the Interstate Independent Telephone Association for Dec. 8, 9, 10 of this year at Chicago.

THE WORK OF THE NATIONAL ASSOCIATION*

By James M. Thomas.

THERE is no time when the worker is so happy as when his task is complete. If he has the consciousness of knowing that his efforts have met with success, it is glory enough. After all, we only really enjoy that which within ourselves we know to be the result of honest endeavor.

Since the very first meeting held by Independent telephone investors and promoters, my duty has been that of chairman or president, and, having been kept always at work in committees, and for the good of the cause, have had no chance to look at the structure which we have built from the standpoint of a critic. Knowing, however, of the work, the builder can well afford to allow thorough inspection of the structure.

I shall never forget the pleasant associations of this organization, and shall always remember with pleasure the confidence, respect and honor which has been shown me by you in electing me, without opposition, for six consecutive terms. It is a compliment never to be forgotten by myself and friends. With all my heart I thank you for it.

James M. Thomas.

The policy of the association—like all other organizations—has been formed from necessity. The cause which made it imperative that we should organize made our policy, and the men who were selected as your trustees to protect and further your interests wisely yielded to the necessity of accomplishing the one thing more essential in the past than all others, and we became therefore what some say now—an organization of one idea. We are all glad that that one idea set in so strongly that it caused us to save to ourselves the right to carry on telephone business.

When those of us who had invested our money in telephone plants found that our enthusiastic friends who had become interested in manufacturing were—through their desire to sell us their goods—blinded to the dangers of patent litigation, we concluded that the old adage, "If you want your work done well, you must do it yourself," held good in this case, and so we organized and placed our shoulders to the wheel with a few who were already trying to uphold our rights in the courts, and have kept at it until the courts have announced that we have a right to not only manufacture and sell telephones, but to operate them, a right which the owners of telephone patents claimed belonged to them only. Men must always establish their rights to do business. This is the first and fundamental part of any business proposition. It has taken us several years to do this in the courts.

Our right having been established, we find as another proof that we were right in our contention the fact that the investors of this country have placed in use more telephones than are operated by the Bell Telephone Company. This is most remarkable and hard to believe.

We feel, after our right has been established and so much capital has been invested in the business, that we have reached a place where the best interest of the business requires a reorganization of this association. Upon what lines shall it be reorganized? This is the most important question to be considered by this convention. This organization up to the present time has always been neutral so far as conflicting interests have been concerned and has always taken the broad ground of protection and promotion of general interests only. We will all agree that in this there shall be no change; that the organization must not be allowed to get into the hands of people who would turn it into a machine to promote the interests of persons or corporations against the interests of others.

We fought this all out in the first convention at Detroit, when there was an effort made to capture it for the benefit of a manufacturing and construction company. The question was so thoroughly settled at that time that there has been nothing of a serious nature in this line with which to contend since. We can take it for granted therefore that the majority of the delegates, if properly informed, will vote for a continuance of that policy.

But, having established our right to do telephone business by appeal to the courts, and having succeeded in building up a business equal to that of the Bell telephone companies, the most important questions for discussion and determination are those relating to the economies in construction and operation, in order to give to the investor the largest net profits under existing telephone rates. As is always the case in competition, we find our companies giving a greatly extended telephone service at a greatly reduced price, so that the question of economy is of great importance. There should, therefore, be an organization which will devote its time to this. We believe this is the next duty presented to this association. Place it for management into the hands of technical telephone men who during the year and at the annual meeting will educate us as to the best and cheapest way of carrying on the business. We have in our ranks a great number of competent and able men who will place this organization on a footing with other technical organizations in other lines.

Since the courts have sustained us, we must expect that we will find other obstacles to overcome. We must expect that capital will seek its greatest reward, that it will not stand by and submit to loss when ways are open to make money. We must see that the business makes money for capital. We cannot expect to continue to get money to invest unless we can show proper results. So, in turning our attention to these questions of reward to capital through an organization as above outlined, we will do much toward overcoming the dangers which arise from a purely commercial fight for supremacy.

Every city and district of the United States has benefited on account of telephone competition. Not only has service been extended about sixfold, but rates have been reduced more than twenty-five per cent. Now that these conditions bring to us new problems continually, we believe they must be solved by rules governing commercial business, and practical telephone men must determine how best to subserve the interests of the investors and the patron.

What we all want, and what every one should work to accomplish, is to bring the business up to a commercial level with other public utilities, so that the investor will feel that with greater development comes a more stable investment.

PROGRESS IN SPRINGFIELD AND KANSAS CITY.

IT is expected that the telephone plant at Springfield, Ohio, which Messrs. Barber & Brailey, of the Central Construction Company, are building will be in operation by October 1. It is predicted that at least 2,000 subscribers will have telephones in operation at that time. In Kansas City the work is progressing rapidly. One main and three sub-exchanges are being built, which will have a total ultimate switchboard capacity of 32,000 lines. It is stated on good authority that the main exchange will probably be in service January 1. These plants are also being installed by the Central Construction Company.

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*President Thomas' Annual Address before the National Convention, Chicago, June 24.

THE VALUE OF GOOD WORK*

By C. E. Tarte.

NUMEROUS and valuable papers have been written regarding the necessity of good construction and how it should be done. It seems superfluous to say more on the subject, but it is such a vital one, it has such an important bearing on maintenance and depreciation, it means so much to service—in fact, it is so largely the one particular point that must not be overlooked when building a new plant or reconstructing an old one, that too much cannot be said about it.

As a general proposition, all of the large companies and most of the small ones are doing new work along modern lines, but there is even now some new work being done that looks as though the people doing it has been asleep for the last six or seven years and had nothing to go by but the standards of those days.

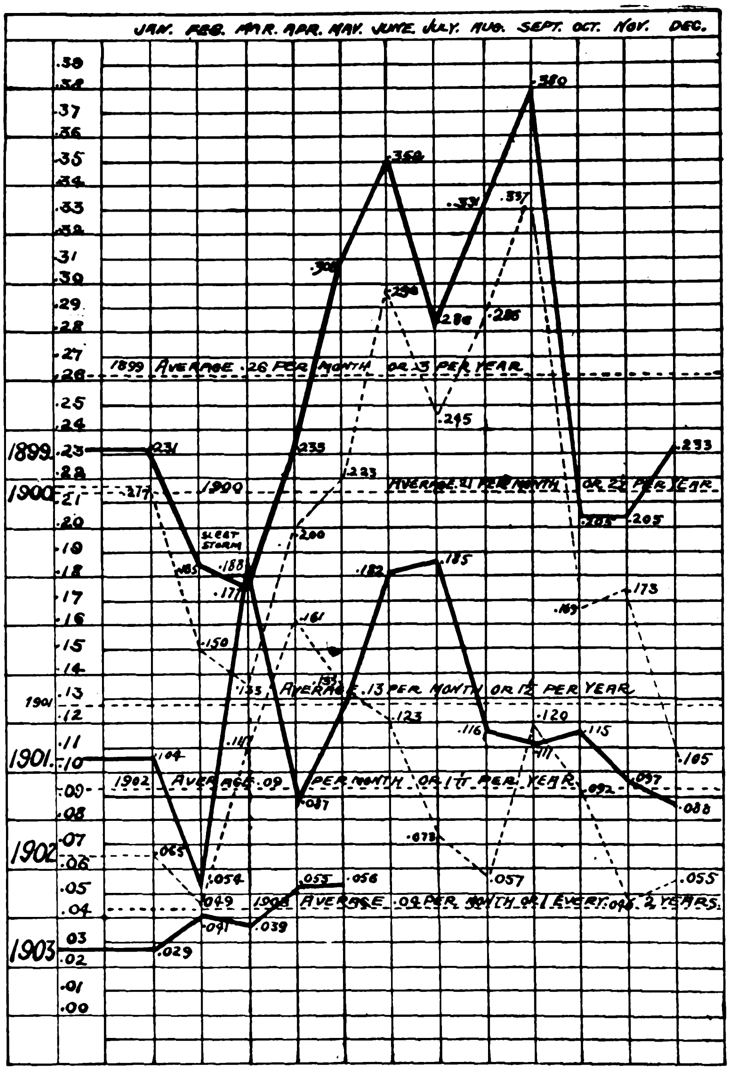

Chart Showing Graphically Trouble Records from 1899 to 1903.

We sometimes wonder whether first class construction will bring the returns that have been claimed for it. I believe the history of a company having experienced both kinds, good and bad, will throw some valuable and interesting light on the subject. Acting on this belief, I will give a brief outline of the experience of the Citizens' Telephone Company, of Grand Rapids, Michigan.

This company started giving service in July, 1896.

The exchange was built according to the standards of that date. Very little cable was installed. Cross arms were filled up. Pins and knobs—twenty wires to the arm—eight, nine and sometimes ten arms were used. Roof fixtures were placed on business blocks. Inside work was done with cotton-covered wire. No attempt was made to run through any kind of tubes where wires entered buildings and ran through floors. Both wires were fastened under one staple. The only protection in the central office was a mica fuse, and so on through all the changes of that class of construction.

In a few years things commenced to get in bad shape. Overloaded and improperly guyed corners commenced to go over and wires to slacken up. Iron wires in the business and factory districts and around railroad yards began to rust. Trees grew up into leads that had been built barely over their tops. Wires commenced to get slack and crosses were frequent. It was a difficult task to locate a cross in a long lead with from 160 to 200 wires in the lead, and a troubleman would often be out half a day or more on one cross.

Imagine the condition after a wind or rain storm. Every one turned out to clear up trouble. Inspectors, installers, line troublemen, construction men and foremen walked up and down the streets and alleys looking for crosses and broken wires. No attempt was made to send after individual troubles until things were well cleared up. The men were told to follow a lead and clear up everything that they could find.

Lightning played havoc with the switchboard and burn outs from crosses with trolley or electric light wires were of frequent occurrence. Occasionally the return wire would get in trouble and anywhere from 50 to 150 subscribers' telephones would be out of order until the trouble was repaired.

This experience taught a lesson. New work was done more carefully and leads were not so overloaded. More aerial cables were used and some underground cables were installed. Slack was pulled and guys were tightened. Corners were reconstructed and considerable money spent getting things into better shape.

This helped, but not enough. Very few lines were on metallic circuits, and when the city installed a new lighting system, using a 7,000-volt alternating current, the telephone company was almost put out of business. Hundreds of telephones could not be used after the city lights were on. On wet nights tree crosses between the return wire and the light wires were frequent and a great many indicators stayed down in the central office and prevented subscribers from getting service; burn outs were frequent and dangerous.

This was the beginning of the end of old conditions. It was absolutely necessary to put in more cables, both aerial and underground, so that "return" lines could be changed to metallic circuits. Wires had to be taken out of trees and kept clear and the good work has been going on ever since.

Now for results. In January, 1899, the company started keeping a record of the number of troubles per day, dividing them into different classes, such as line troubles, battery troubles, transmitter troubles, inside wire troubles, etc., and a study of this trouble record makes interesting reading.

In the year 1899, two years after service was first given and before much had been done to put the outside plant in good condition, the record shows that there was an average of one line trouble every four months, or three per year for each and every subscriber in the exchange, and this record does not include line troubles that were cleared up and never reported, as in those days a man sent out to clear up all of the crosses in a lead would find a great many that he had not heard of.

Some improvements were started in the latter part of 1899, and the record for 1900 makes a better showing. There was one line trouble every five months, or 2½ per year per subscriber.

Improvements kept on steadily. All new work was first class; lines were being changed from "common return" to metallic, and 1901 showed a decided gain. One line trouble every eight months, or 1½ per year per subscriber.

The year 1902 continued to feel the good effects and showed one line trouble every eleven months for each subscriber's line.

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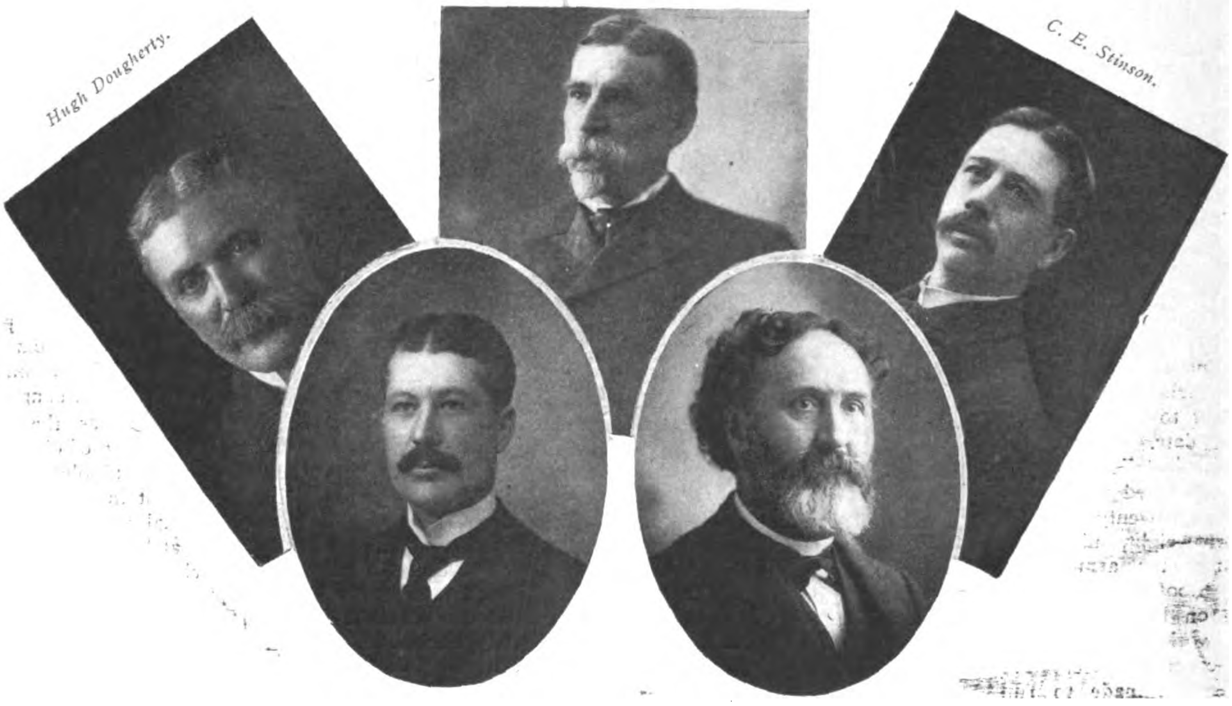
*Paper read at the convention of the National Telephone Association, Chicago, June 24, 25, 1903.

The good work still goes on. Knob wires are being done away with entirely. Roof fixtures and wires are disappearing rapidly. Service wires are being run in such a way that troubles from them are practically unknown. Leads are being made lighter and cables are taking the place of open wires. The result is that storms may come and go, but unless they are cyclonic in character, service goes uninterruptedly on.

Records for five months in 1903 show that there will be ½ of one line trouble this year for each subscriber, or one every two years.

In other departments the same improvement is noted. All cables installed during the last three years have been equipped with modern protection, and no central office apparatus has been burnt out on any line thus equipped. Inside wiring is now done with rubber covered and braided wire. Wires are brought into buildings through tubes, etc. The result is that the rewiring of buildings on account of leaks and short circuits is becoming a lost art.

As to the financial part of it. What has been gained? The difference in cost per telephone, in salaries alone, of running what might be called the maintenance department (*i. e.*, the inspection and trouble department, the maintenance line crew and the emergency wagon) for the year 1903, as compared with 1899, will be $2.63 per telephone, or $13,413 per year for the 5,100 telephones that are now in service, and this notwithstanding the fact that wages are considerably higher than they were in 1899.



L. A. Goudy.

Hugh Dougherty.

C. E. Stinson.

C. E. Wilson.

E. B. Fisher.

The depreciation on the present plant will not be one-third of what it was on the original one, and the value to the company of the better service, resulting from fewer interruptions, cannot be estimated in dollars and cents.

In spite of the fact that our opponent has a modern Bell central energy multiple board, and that their rate until recently was $8 lower than ours for residence service and from $8 to $18 lower for business service, the Independent company's switchboard is filled up and six or seven hundred are on the waiting list. Good service has brought about this state of affairs.

Results on toll lines have been as satisfactory as with the local exchange. Building of new lines according to modern practice, reconstructing old lines where necessary and putting them in first-class condition, protecting apparatus from lightning and other foreign currents, using no wire smaller than No. 10, B. & S. gauge, etc., have so changed the condition on these lines that trouble is now taken care of with fewer men than it required three years ago when there were only about one-half as many miles of circuit.

The most important factor in construction work, as well as in the maintenance and operation of telephone exchanges, is the human element. You may get the best material that is in the market and buy the best tools that were ever made, but unless your superintendent of construction understands his business thoroughly and has the saving quality of common sense, unless your foremen are intelligent enough to follow the line of work laid out by your superintendent of construction and have the push and energy to see that the men under them do the work carefully and well, you will be disappointed in the results and lasting qualities of the work.

Having hired good men, thoroughly competent to do good work, it seems absurd to give them poor material to work with. Labor is one of the largest items of expense in construction work, and good labor used on material that will wear out in two or three years is wasted.

Have first-class material to work with and hire first-class men to do the work. When it is finished you will have something to be proud of. Depreciation will be low, maintenance will be reduced to the minimum and the quality of service will be such as to give you the confidence and backing of your subscribers.

The service question is more important than it was a few years ago. In the early days the public was satisfied with anything to beat the Bell, but the time has arrived when by our deeds we will be judged, and the company giving the best service at the most reasonable rates is the one that will get the business and will hold it.

PRESIDENT INDICTED FOR BRIBERY.

C. M. ERWIN, president of the Western Illinois Telephone Company, and J. F. Tellebuescher, an alderman of Quincy, Ill., have both been indicted by grand jury for bribery. The charge is that Erwin gave and Tellebuescher accepted a bribe of $10,000 to secure the passage of a telephone franchise. It is alleged that the $10,000 was to be employed in influencing members of the council and that certain certificates of stock in the telephone company of the face value of $1,000 were delivered to certain aldermen, to be redeemed in cash immediately after the passage of the ordinance.

T. B. Lee. *W. H. Durin.* *H. D. Critchfield.* *S. P. Sheerin.*

EASTERN TELEPHONE DEVELOPMENT*

By F. A. Demarest,

General Superintendent Inter-State Telephone and Telegraph Company, Trenton, N. J.

Owing to the fact that the Independent telephone movement was born in the West, that its pioneers were western men and that its greatest development has been in the West, few people realize the enormous strides that the industry has made in the East.

As a matter of fact, development did lag with us in the Eastern States for years after the Independents had built up many substantial enterprises throughout Indiana, Illinois, Ohio and other states in the Lake and Mississippi regions. Somehow it seemed a difficult task to make the eastern people realize that the days of the Bell monopoly were over and that they could find relief from telephone oppression through the organization and building of Independent companies. But the knowledge did finally come home to them, and since it has struck, Easterners have gone about the task of fighting the telephone fight with vigor and energy. Unfortunately, however, they have been so busy building and working that they have had little time for exploiting their achievements, so that but little is known of what they have really done; and I am sure that what I will tell you of their work will come to most of you as a revelation—a very satisfactory revelation.

The first companies to be established in the Eastern States had their birth in the State of Pennsylvania, and came into existence about the time of the expiration of the basic Bell patents. The Bell Company, taking stock from its previous western experience, knew that it couldn't afford to calmly ignore opposition companies, and so naturally it made most determined efforts to crush out the eastern Independents at the very first. The early promoters found it practically impossible to obtain financial backing. Telephone users were desirous of obtaining more efficient service at reasonable rates. The Bell satisfied neither of these demands, and the people knew from experience that it was impossible to obtain relief through the Bell Company. But capitalists didn't believe that an Independent company could make a successful stand against the old company, and it was hard work persuading them to back such a company. The Bell Company, too, fully realized this sentiment and made much capital of it. Financiers finally decided they could take some risk in the hope of improving telephone facilities, and so the first Independent systems were launched.

But then appeared another serious difficulty. There was at that time practically but one Independent manufacturer in the field, and it was almost an impossibility to obtain suitable apparatus. The Bell Company brought its powerful organization to bear to hamper the construction of these early plants, but the Independents could not thus be driven from the field, and they finally conquered every difficulty and built their plants.

And then they discovered that mistakes had been made by themselves; they had been entirely too conservative in their estimates of the business they could look for. Their growth was absolutely unprecedented. Plants were built from the standpoint of the business the Bell Company was doing. But the new systems proved so popular from the start that they were utterly inadequate. The York Telephone Company, at York, Pa., for example, was one of the first Independent companies in the State. Its promoters provided for three hundred subscribers. This was the ultimate number they expected to obtain. But within one year they found that their original plant was utterly inadequate, for within that time they had obtained between seven hundred and eight hundred subscribers, and new ones were signing contracts every day. Williamsport, Pa., where the West Branch Telephone Company had been started about the same time as the York plant, faced like conditions. The kind of service they gave, with makeshift construction, poor apparatus and overcrowded and overworked plants, can be imagined. But, nevertheless, it was superior to the service the Bell had been furnishing, and the rates were very reasonable.

After the first Independent plants came into existence in Pennsylvania hundreds of others sprang up almost over night. Their growth was indeed remarkable, and from the start they were successful. From Pennsylvania the movement spread to New Jersey, Maryland, New York and Delaware, the newcomers everywhere meeting with success and multiplying rapidly. As showing the wonderful growth of these early eastern systems may be mentioned Allentown, Pa., which went into service in July of 1900. The Allentown company built a plant to accommodate 2,000 subscribers, and its promoters estimated they would have 600 within three years. They felt the plant would be doing very well to secure this number. Imagine their amazement when within the first six months 1,000 subscribers had been connected. Allentown now has a modern, finely-equipped plant serving 2,400 subscribers.

The early exchanges in other places in Pennsylvania, New Jersey, New York and Maryland had like experiences. In almost every case the number of subscribers that could be obtained was far underestimated, just as it was by western Independents. This and their very poor construction and antique apparatus sorely handicapped the development.

To tell of the development that has come in the states of Pennsylvania, New Jersey, New York and Maryland within the last two or three years would take much more time than has been allotted to me. I will, however, endeavor to present to you in a general way a slight conception of the scope of the Eastern Independent industry.

The greatest development in the State of Pennsylvania has come in the eastern part of the State. The western part of the State, however, has been well looked after by the Pittsburgh & Allegheny Telephone Company and other companies, which operate thriving exchanges in Pittsburgh, Alegheny, McKeesport and other places. Altogether the Pittsburgh & Allegheny Company has over 10,000 subscribers, and with its own lines and those

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*Paper read at National Convention, Chicago, June 24 and 25, 1903.

J. B. Ware.

S. E. Wayland.

A. L. Hutchinson.

H. C. Young.

of other Independent companies it has connection with more than 40,000 subscribers on Independent systems. The Pittsburgh & Allegheny and the other Independent companies in the western part of the State have had a hard fight against the Bell Company, which has resorted to all sorts of tricks in its vain efforts to drive out competition.

Eastern Pennsylvania is practically covered with Independent exchanges. These are all thoroughly connected by first-class toll lines, which, taken as a unit, make a very strong Independent system. The present system is the outgrowth of the numerous small exchanges that were started in 1894 to 1898. They were very poorly built, and it has only been within the last three years that toll lines have been built. They were isolated from each other, and the Bell Company could bring its entire powerful organization to bear to extinguish these companies separately. Altogether the outlook was far from encouraging, and something had to be done to bring the exchanges into more harmonious working. In 1900 the United Telephone and Telegraph Company, which has headquarters in Philadelphia, was organized for the purpose of combining a great many of the smaller Independent systems in eastern Pennsylvania. The companies that are now operated by this company are the Shamokin Valley Telephone Company, incorporated in December, 1894, and one of the very first Independent companies in the State; the Schuylkill Telephone Company, organized in May, 1895; the Octararo Telephone Company, of Lewisburg, organized August, 1895; Delaware County Telegraph and Telephone Company, organized September, 1895; Altoona-Phoenix Telephone Company, organized September, 1895; Keystone Telegraph and Telephone Company, organized June, 1896; North and West Branch Telephone Company, organized July, 1896; People's Telephone and Telegraph Company of Lebanon, organized March, 1897; Phoenixville Telephone Company, organized August, 1897; Chester County Telephone and Telegraph Company, organized February, 1898; Independent Telephone Company, of Lancaster County, organized April, 1898; Central Commercial Telephone Company, organized May, 1898; Montour & Columbia Telephone Company, organized May, 1898, and the Ambler Telephone Company, which was organized in March, 1900. The United Telephone and Telegraph Company also operates many other exchanges and hundreds of miles of toll lines.

In Philadelphia the Keystone Telephone Company has been operating a little over a year, and has had remarkable success. It now has more than 10,000 subscribers, with new ones deserting the Bell service for the Independent every day. Many of the principal business houses in Philadelphia have discarded the Bell telephone altogether. The long-distance branch of this company, known as the Keystone State Telephone and Telegraph Company, is rapidly building up a system of toll connections with the surrounding territory that will enable Philadelphians to communicate to all parts of the country over the Independent lines. It has effected traffic agreements with the Inter-State Company of New Jersey, which covers the entire State; the United Telephone and Telegraph Company, the Consolidated companies of Pennsylvania, the Standard Telephone and Telegraph Company, the Eastern Telephone and Telegraph Company and the Maryland Telephone and Telegraph Company, so that connections may now be had from Philadelphia all over the states of Maryland, Pennsylvania, West Virginia, New Jersey and even to some points in New York State. In a few months these connections will be greatly augmented, as lines now building will form a most comprehensive system.

In the northeastern part of Pennsylvania a number of Independent companies have formed the Consolidated Telephone Companies of Pennsylvania. The principal exchanges are at Wilkesbarre, Scranton, Hazleton, Reading and Allentown. These exchanges are connected with the system of the United Telephone and Telegraph Company, with the Maryland Telephone and Telegraph Company, the Inter-State of New Jersey, the Keystone of Philadelphia and many others, thus giving perfect toll facilities to its patrons.

In the State of New Jersey the Inter-State Telephone Company was organized in April, 1901, for the purpose of consolidating the various New Jersey exchanges and constructing a toll-line system. The companies it acquired were the Paterson, Passaic and Suburban Telephone Company, the Home Telephone Company of Trenton, the Burlington County Telephone Company of Mount Holly, the Elizabeth Telephone Company of Elizabeth, the People's Telephone Company of Vineland, the Bridgeton Telephone Company of Bridgeton, the Enterprise Telephone and Telegraph Company of Millville, the Bordentown Telephone Company and the Atlantic Coast Telephone Company of Atlantic City. The Inter-State Company has practically acquired all the Independent systems in New Jersey except the Eastern Telephone and Telegraph Company of Camden. It is rebuilding all the various systems acquired, as they had been very poorly constructed with antiquated apparatus. All exchanges are now common battery with metallic circuits throughout. At the present time the company operates about 10,000 telephones in New Jersey, and it has been in operation only about two years. It has constructed hundreds of miles of toll lines, and building operations are still going on. The number of subscribers is increasing at an unprecedented rate. It has connections with Philadelphia over the lines of the Keystone State Telephone and Telegraph Company, and also has connection with the United Telephone and Telegraph Company, the Consolidated Telephone companies and the Maryland Telephone and Telegraph Company, and will soon have New York connections by way of the lines of the United Company.

The first effort toward getting an Independent company into the State was made in 1894, when some capitalists of Newark, N. J., attempted to organize to do business in Jersey City, Hoboken, Paterson, Passaic, Orange, Newark, Elizabeth, Plainfield, New Brunswick, Asbury Park and other cities. This move finally led to the organization of the State Telephone Company, with principal offices in Jersey City. It built exchanges in Jersey City, Newark, Trenton and other places, and constructed a number of miles of toll lines. There was every prospect for the ultimate success of this company, as the public was quick to appreciate the advantages of it and to patronize it. But finally the Bell Company brought such strong pressure to bear and offered so many inducements that the Independent promoters couldn't hold out, so the Bell Company obtained possession of most of this company's property, at a handsome profit, however, to its promoters.

In the meantime many other companies sprang up in New

Jersey, which were more successful in meeting the competition of the Bell Company. Some of the early New Jersey Independent companies were the Burlington County Telephone Company of Mount Holly, organized in 1897; the Bordentown Telephone and Telegraph Company, organized in 1898; the Paterson, Passaic and Suburban Telephone Company of Paterson and vicinity, organized in September of 1899; the Newark Molecular Telephone and Telegraph Company, Overland Telephone Company of New Jersey, Pennsylvania Overland Telephone and Telegraph Company, People's Telephone Company of New Jersey, Elizabeth Telephone Company of Elizabeth, Dowling International Telephone Company, Echo Telephone Company of New Jersey, People's Telephone Company of Vineland, Fairbanks Telephone Company, Bridgeton Telephone Company of Bridgeton, and a score or more of others. Many of these never commenced operations, but were succeeded by other Independents. A few of them were bought up by the Bell, and the remainder, with hardly an exception, have had a most successful existence, having been combined with other companies within the last three years, as they early learned the value of combination.

The development in the New England States has been very slow. The reason is to be found in the fact that New England is the home of the Bell Telephone Company. Here they have enjoyed a complete monopoly that has been more far-reaching than in any other section of the country. Until the last year or so the Bell virtually owned the New England States; that is, so far as the telephone business was concerned. Independents found it absolutely impossible under the laws of the New England States to incorporate and instal systems. They were combatted not only by the Bell, but by politicians, the press, and even by the mass of the people. But now these states are awakening to the fact that they have suffered greatly from a lack of the Independent movement. The various State laws have been, or will be, revised, and Independent companies have obtained franchises in many New England towns. Several New England cities already are served by Independent companies. Fall River and New Bedford have had Independent systems in operation for over a year that have met with great success. Westerly, R. I., has had a system in operation for over eight months, and at Springfield, Mass., an exchange is being constructed. Boston, Mass., has an Indepndent system, serving about four or five hundred subscribers. Unfortunately this company has made but little progress and is believed to be controlled by the Bell. Portland, Me., will soon have an Independent system with a capacity for serving ten thousand subscribers. It is being built by the Northeastern Telephone Company, which operates exchanges in several Maine cities and owns several hundred miles of toll lines.

In the State of Maryland as early as 1894 Independent systems had been started, and proved to the satisfaction of the Maryland public that the Independent exchange was a necessity and a success. As a result, companies arose in Maryland and grew and thrived. The largest company is the Maryland Telephone and Telegraph Company, which operates a fine exchange in the city of Baltimore, and exchanges in many other Maryland cities. It also owns a large toll system, connecting with the Pennsylvania and New York systems in the North and with Independent exchanges south of Maryland.

In New York State a most remarkable development has come within the last four or five years. The building operations alone at present being conducted in that State amount to millions. Every city of any importance, with the exception of New York, has an Independent system. Among the principal plants are the Frontier Telephone Company, which has just commenced service at Buffalo with four thousand subscribers. Within a year this number will have been increased to 10,000. Albany has a splendid Independent system in operation, which is offering such a good service at lower rates than the Bell that it is rapidly superseding the Bell system. Ithaca has a new company which is giving service to more subscribers than the Bell Company. Rochester was one of the first of the large cities built by the Independents. The Rochester Company has just recently installed a new switchboard, double its original capacity, which shows its development has been very satisfactory. Niagara Falls has an Independent system, and is the headquarters for the Niagara County Telephone Company, which operates between 4,000 and 5,000 subscribers in its several exchanges. In Binghamton the Independents have 1,500 subscribers to 1,100 of the Bell; in Hornellsville there are 1,008 Independents and but 75 Bell; in Jamestown there are 1,630 Independent subscribers and only 630 Bell subscribers, and so on through all the cities and towns of the State the Independents have entered in and have taken the business from the Bell. They are building long-distance lines, too, and toll lines, so that their system within the next few years will cover every nook and corner of the State.

Of all the large eastern cities, the only ones not operated by the Independents are New York City, Providence, R. I., Jersey City and Newark, N. J. I feel certain that New York will have an Independent company in the near future. New York undoubtedly presents problems more difficult than any ever before met by the Independents. In the first place, it would require an enormous expenditure to install a system there, and would present some very fine points in its engineering features. The Bell Company operates a very good system in New York, which makes the problem all the more difficult. But these obstacles are surmountable. Independent connection with New York is demanded, and it is bound to come. In Jersey City and Newark, N. J., the systems that were bought are operated by the Bell as Independent systems to keep out competition. It is this fact that makes the Jersey City and Newark propositions so difficult to the Independents. But the Independent subscribers in the State and in New York State, who greatly outnumber the Bell subscribers, are demanding the connection of New York City, Jersey City and Newark, and it is bound to come.

The outlook in the East is very bright and promising. In the not distant future every city, every town and every farm-house will be served by an Independent system, and every inhabitant of the cities and towns will be using telephones. I believe this is so, and that it is not a too optimistic prophecy. The development up to the present time has been most remarkable, and there is no reason that the future development will not be as great.

NO COMBINATION IN PITTSBURG

By H. A. Lane, *Special Correspondent.*

A REPORT was published recently to the effect that the Pittsburgh & Allegheny Telephone Company had consolidated with the Central District Printing and Telegraph Company, the Bell Company in Pittsburgh, Pa. The fact that Sidney H. Browne, vice-president and general manager of the Pittsburgh and Allegheny Company, had been in New York for several days was used to add strength to the rumor. It was learned, however, from all parties officially interested in either company that the report had no foundation in fact, and that the companies would continue to operate entirely independent of each other. Since the increase in the capital stock of the Pittsburgh & Allegheny Company and the purchase of a controlling interest by local capitalists, this or similar rumors have been current several times, but have been as often denied.

Joshua G. Splane, who has resigned his position with the Standard Oil Company to take the presidency of the Pittsburgh & Allegheny Company, is one of the best known and most capable men in his line of work in the country. He is a Pittsburgher, having been born in the Iron City in 1866, and lived there continuously except from 1887 to 1890, when he was located at Toledo. He received his education in the city schools and the Western University. In May, 1885, Mr. Splane entered the service of the Standard Oil Company, where his business ability and integrity were soon recognized. He was made manager of the National Transit Company, which controls the vast telephone and telegraph service of the Standard over the country. Under his management the service was greatly improved, and in some respects was superior to the service given by some of the regular telegraph companies.

Mr. Splane is also president of the Chester Oil Company, president of the New Cumberland Water and Gas Company, president of the Fourth Avenue Building and Loan Association, and a director in several other local corporations. He was foremost in organizing the Home Trust Company, the latest of the new large financial institutions in Pittsburgh. He is a thirty-second degree Mason, a member of the Pittsburgh Stock Exchange, of the Young Men's Republican Tariff Club, and of the Pittsburgh Press Club.

THE TELEPHONE AND THE TECHNICAL SCHOOL*

By J. C. Kelsey.

In this commercial age, whenever a new branch of science or industry exhibits unusual activity and growing importance, the officers of our universities are ordinarily prompt in adopting a course of instruction especially adapted to that particular work. Electrical engineering, journalism, insurance and commerce are some of the branches which in these later days have received consideration by leading universities. A late and prominent branch of industry is that embraced by telephony, and this lusty offspring of electrical engineering now vigorously demands recognition. But progress will be slow in this direction if we rely upon scholastic opinion. For prior to the adoption of the course of telephone engineering at Purdue University, inquiries were made of many persons known to be interested in the telephone and of a number of professors of electrical engineering. Nearly every person interrogated who was interested in the telephone from a manufacturing or operating standpoint was in favor of the movement, while nearly to a unit the idea was opposed by the college people on the ground that there was no call for such a course.

J. C. Kelsey.

There is a great deal of justification for the attitude of the teachers. For years they have tried to look into the possibilities of the telephone. There was not much to look into, for the pains taken by the telephone interests of past years to help them were microscopic. In most university laboratories, even to this day, a Blake set and an obsolete drop are the sole representatives of a great branch of electrical engineering. Surely, in these there is not much to attract the teacher or the student, much less induce him to look with favor upon the advantages of studying telephony as a life work.

But changes have taken place. Competition brings out man's best effort. The old and experienced telephone man, with his knowledge of detail, has combined his talents with the later generation of electrical engineers, and as a result a system of engineering has been evolved which combines all the lighter, as well as much of the heavier construction features of electrical engineering, making the practice of telephone engineering an acceptable profession. However, to place telephone engineering where it rightly belongs one thing yet remains, and that is the *attention of the scientific world must be attracted by our deeds and words.* The American Institute of Electrical Engineers is the body to which we look for the official expression of the electrical profession. Everything good, novel and interesting is brought before this body in the fullness of time. It is discussed freely and honestly, and if found meritorious, is given a place in the records for all men to read and to think about. If all the telephone engineers had permission or had the inclination to take broad and comprehensive papers before that body (there is plenty of material), the engineering world would more fully realize the breadth of telephony, and scientific men would take more interest in studying the various and vexatious problems now confronting the practice of telephone engineering. But all that has been thus far brought before the institute is in general a sort of apology, an evasion of the subject by a prolonged discussion of rates or an assurance that telephone engineering is a broad profession. It will take more than assurances to establish this fact. How much better it would be if an institute of telephone engineers could be organized and perpetuated?

The general public has not been fully educated as regards the telephone. It has seen demonstrations of light and power and transportation and has been impressed. But the telephone is not a spectacular agency, and the public is not at all impressed. When students enter college to take mechanical or electrical engineering they think they have a definite idea of what they want and ask no questions. But regarding the teaching of telephone engineering, many, many questions are asked: What do you teach? Of what value is it? Is it necessary? Why cannot one learn in practical work? What is there about a telephone that takes two whole years of study? "Why, my son could talk from the barn to the house years ago."

And a more intelligent lot of questions are asked, such as: "Is it of benefit to the telephone field?" "Are you training young men for the benefit of manufacturers?" "Are you trying to make them conversant with the operating side?" "Is the work of a practical nature?" "If we hire your graduates, will they be able to take an active hand in our business?" "And last, but not least, are you Bell or Independent?"

This last question cannot be evaded, and will be answered here. There seems to be no neutral ground, and a school naturally has to seek neutral ground, not being so constituted as to recognize business complications. Must the telephone be an exception? The university works in the open field, and its investigations belong to the world. The apparatus it uses must necessarily come from the open field. Freely the open field gives, and freely it should receive.

To say what should be taught would be impertinent. We want to know that, for we want to make the course for you, to meet your needs. As now planned and administered, the telephone course begins in the junior year, after the student is grounded in mathematics simply, and the fundamental principles of electricity (the regular electrical course is taken, substituting the telephone for the steam engine). The first consideration is a study of circuits, beginning with the old series grounded system, on through the metallic self-restoring drop period, and then into common battery systems. Each and every commercial common battery system is discussed and analyzed in the class room, and in the laboratory the various relays, impedances and lamps are arranged on tables, not only to show accuracy of connection and transmission, but to enable the student to observe the methods and rules of operation.

After the "A" circuits are well understood, the "B" circuit of each system, with the accompanying order wire arrangement, busy test method and manual and automatic ringing, is taken up. The laboratory is divided, so that the "A" and "B" operators are in separate rooms, thereby making the student appreciate fully the usage of the order wire, the method of disconnection and the general rule of operation.

After the "B" circuit, with its free interoffice service and its charge for interurban service is investigated, the toll business is studied. The many phases of operation, the methods of switching and recording and the auxiliary uses of the toll line are given as much attention as is possible outside of regular business.

Upon this foundation, the second year begins the details of the various systems and a study of the appliances and circuits connected with the chief operator's, chief inspector's, supervisor's and manager's desks. Complete specifications and drawing of entire systems are made; also a mathematical investigation of the loaded line is made, in association with experimental conditions made as practical as possible, operating cable being used for that purpose. The limitations of common battery systems, as regards distance of a subscriber from the exchange, affecting transmission and operation of relays; the effects of induction from one, two or three-phase alternating currents, from 104 to 9,000 volts pressure, or from continuous currents of from 110 to 500 volts, or from series arc systems; quick and efficient methods of cable testing, finding wet spots, open places and crosses under actual working conditions; considerations of patent law; specifications and estimates upon overhead and underground construction; these are among the features of the course.

Is such a course valuable? In the first place, it must be understood that a technical school does not pretend to teach a man a trade or a profession. It only teaches him how to begin; it prepares him as a skilled apprentice and not as a journeyman. Failure on the part of the student to realize this has frequently put him in a somewhat disagreeable light.

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*Paper read before the National Association Convention at Chicago June 24 and 25, 1903.

As to the necessity of the course, the experience of electrical engineering may be recalled. Time has disproved the early claims of the futility of such a course, for all the graduates of the technical schools are hired by the electrical interests before they leave the institutions. Upon this evolutionary ground we hope for the ultimate appreciation of the necessity of telephony having its proper place in the technical schools.

These schools can be of benefit to the telephone field by giving the results of research to the telephone public. And if they are given knowledge of the various conditions of service, the schools will help to evolve, if not a standardization, at least a more general understanding of the rules and laws of design and operation. Schools have time in which to collect facts together and look into details and reasons, which the busy commercial man has not.

And if a school can do this, it is certainly an important factor in the progress of the open telephone field and should be approved of and encouraged by every worker in the telephone industry. The authorities of Purdue are fully convinced that it can do all that has been claimed and are well satisfied with the results of one year's experience with the telephone. We feel certain of the approval of everyone interested in telephony and of the ultimate co-operation of every technical school in investigating, and classifying the various parts of this industry.

MR. DeWOLF'S ANSWER IN THE KELLOGG CASE

IN the suit of Francis W. Dunbar, Kempster B. Miller, Franz J. Dommerque, W. W. Dean and other minority stockholders against the American Telephone and Telegraph Company., to set aside the sale of the Kellogg Switchboard & Supply Co. stock, a separate answer has been filed in the Illinois courts by Wallace L. DeWolf. It will be remembered that Mr. DeWolf, who is president of the Kellogg Company, was made one of the defendants in the suit of the minority holders, it being charged that Mr. DeWolf made the conveyance of stock wrongfully under the power of attorney granted by Milo G. Kellogg. In his answer denying that he acted wrongfully, Mr. DeWolf says, among other things, that he was actuated in making the sale of Mr. Kellogg's stock by the financial embarrassment that threatened the Kellogg company, owing to the fact that the Everett-Moore syndicate owed the Kellogg concern $275,000 in December, 1901. "Nearly all of this was in the form of notes," declares Mr. DeWolf in his answer which then continues as follows:

> Of these notes, about $222,000 had been discounted at various banks upon the guaranty of the Kellogg Company, and not less than $93,000 thereof upon the personal guaranty of Milo G. Kellogg. At the same time the indebtedness of the Kellogg Company, in accounts and bills payable, was in excess of $394,000 upon not less than $169,000, of which Milo G. Kellogg had made himself personally liable as guarantor, and for part of which stocks and securities of said Milo G. Kellogg, covering a large part of his private fortune, were pledged as collateral.
>
> The creditors of the Kellogg Company and the banks with whom the Everett-Moore paper had been discounted were pressing for payment of their claims, and, while the Kellogg Company * * * was substantially solvent, its financial position was one of the most imminent peril and required the ablest and most skilful attention from its officers to preserve its credit and save it from ruin.

Mr. DeWolf then recites the facts of Mr. Kellogg's physical break-down, which forced that gentleman to retire from active business in November, 1901, after executing the power of attorney. In all that followed Mr. DeWolf declares he "counselled fully and freely," with Leroy D. Kellogg, the secretary and treasurer of the company and the son of M. G. Kellogg, and with

> Clarence Buckingham, a director and one of the members of the Executive Committee of said Kellogg Company in and about the sale of stock, and all the matters herein referred to, and took no step without the full knowledge and approval of said Leroy. The disability of Milo G. Kellogg largely increased the embarrassment of the commercial situation in which the Kellogg Company was placed, and the commercial pressure upon the Kellogg Company, in its turn, furnished elements of great danger to the personal fortune of Milo G. Kellogg, which, as well as the fortunes of the Kellogg Company, this defendant was in duty bound to protect and conserve to the best of his ability.
>
> Some time early in December, 1901, Leroy suggested to this defendant that application be made to Enos M. Barton, who had been for many years a friend and business associate of said Milo G. Kellogg, and president of the Western Electric Company (of which said Kellogg then was and for many years had been a stockholder to a very large amount), with a view to the possible purchase by said Barton of said Milo G. Kellogg's stock in the Kellogg Company. This suggestion of Leroy D. Kellogg seemed not only advisable, but the only plan that promised any degree of success, the Kellogg Company having made no profit the previous year and the Everett-Moore Syndicate having suspended payment. And thereupon, with the knowledge and approval of said Leroy and of said Buckingham this defendant approached said Barton and suggested to him the purchase of all or part of said Milo G. Kellogg's stock in the Kellogg Company. Until so approached neither said Barton nor any other person associated or interested with him had mentioned or suggested to this defendant, or to any other person, to his knowledge, the sale of said Kellogg's stock to said Barton, or to the American Telephone and Telegraph Company, or to the Western Electric Company, or to any one connected with either of them. Upon first being approached, said Barton hesitated and took the question under advisement, and the negotiation extended over a period of some weeks. On or about January 4, 1902, an agreement was reached.

Under this agreement Barton consented to buy not less than two-thirds of the total shares of the Kellogg Company at $45 per share in cash in addition to paying Mr. Kellogg pro rata, as the bills receivable due the company (amounting in all to $323,248) were collected. Barton agreed to look after the outstanding account due by the company, $251,464. The estate of Mr. Kellogg was to be relieved of all liabilities. After setting forth this agreement, Mr. DeWolf continues:

> The sale and change in ownership of said stock was not to be disclosed at the special instance and urgency of this defendant, and the said Leroy D. Kellogg, said Leroy particularly insisting that, if the change of ownership should become known, it might so affect the Everett-Moore Syndicate as to impair and perhaps wholly destroy the chance of collecting the amounts due from said syndicate and its associate bodies to the Kellogg Company. Since July 4, 1902, when said Milo G. Kellogg became aware of what had taken place, as hereinafter set forth, the sale of said stock has been kept secret with the knowledge of said Kellogg with the hope that said Kellogg might regain the control of all or part of his stock or return to his former position as president of the Kellogg Company; that up to the present time no part of the said indebtedness of the said Everett-Moore Syndicate has been paid by said Syndicate. * * * * The business record of the Kellogg Company during the year 1902 was by far the best in its history, not only with respect to the amount and profitableness of sales, but to the quality of the work turned out, the comparative freedom from complaints, and the general reputation and standing of the company among purchasers, and, whereas, for the eleven months ending December 1, 1901, when this defendant assumed control of said business, the reports of the auditors, allowing practically nothing for depreciation, showed a nominal profit of only $32,053.58, made largely from the profits of the pole business, the succeeding thirteen months, ending January 1, 1903, as shown by the reports of the auditors after writing off $109,858.58 for depreciation, shows net profit of $205,778. That there has not been at any time, to the knowledge of this defendant, any hint or suggestion on the part of any stockholder or person interested in the stock of the company, that its affairs should be conducted otherwise than in its own interest and with the desire and effort to make its business profitable and permanent; and this defendant believes that, unless prevented by the course of the complainants in filing said bill, the business of the Kellogg Company will continue to be profitable and prosperous.
>
> This defendant says that at no time has he or the board of directors of the Kellogg Company had in contemplation the dissolution of said company, but, rather, as above stated, its continuance and growth; that all contracts are being fulfilled and bonds given for their completion where required, and that new contracts are being solicited and secured as far and at as profitable rates as possible; that no bids have been made for work at unduly low prices for the purpose of underbidding the Stromberg-Carlson Company, or otherwise; and that said Milo G. Kellogg has repeatedly advised this defendant on business matters relating to the company, and that such advice has been carefully followed in all instances.

(Continued on page 439.)

ELECTRICAL MEASUREMENTS—ARTICLE XIV.

THE WHEATSTONE BRIDGE

By Arthur Vaughan Abbott.

Of all of the instruments which the electrical engineer uses in measurements there is none which has so wide a range or is so universally employed as the apparatus known as the Wheatsone bridge. Suppose four conductors—*B C*, *C E*, *B A* and *A E*—to be arranged in the form of a parallelogram, as shown in Fig. 1, so that the conductor *B C* and the conductor *B A* are joined at the point *B* in parallel. Conductors *C E* and *A E* are joined at point *E* in parallel, while at the point *C* the conductors *B C* and *C E* are joined in series and at conductors *B A* and *A E* are also in series. Suppose, further, that a battery be provided and the wires from its terminals be joined to points *B* and *E*. Now evidently between *B* and *E* two paths are provided, one *B C E* and the other *B A E*, over which the battery current can flow. It has been shown that the amount of current which traverses any circuit is directly proportioned to the electromotive force applied to the circuit, and inversely proportional to the resistance of the circuit, and as there are two circuits between *B* and *E* and *C* it is natural to expect that the amounts of current in these two paths will be inversely proportional to the resistance of each one.

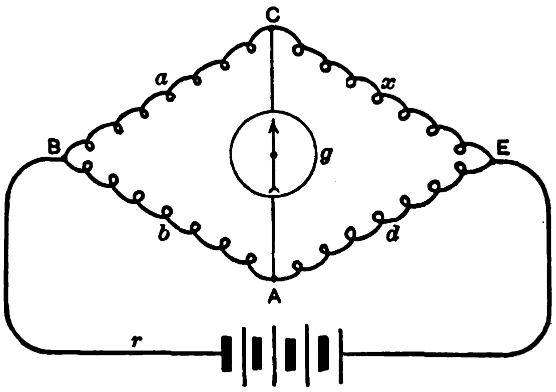


FIG. 1.—*Diagram of Wheatstone Bridge.*

Electric potential has been defined as a kind of force which urges electricity to move along the conductor provided for it. From this it follows that the electro-motive force applied to any circuit is gradually expended or used up in producing the flow of electricity, and consequently the electro-motive force will be greatest at the positive pole of the generator and will be least at the negative pole, or, in other words, between the positive and negative pole all the electro-motive force supplied by the generator is expended in overcoming the resistance of the circuit and producing the flow of current which takes place. So there is a decrease in electro-motive force from point to point over the entire length of the conductor. This decrease is termed "fall of potential" and is exactly in proportion to the resistance of various parts of the circuit. For example, suppose a battery having an electro-motive force of 10 volts to be joined by three conductors in series, one of which had a resistance of 2 ohms, the second a resistance of 3 ohms and the third a resistance of 5 ohms. Evidently the total resistance of the circuit is 10 ohms, and if the battery has an electro-motive force of 10 volts, the current, according to Ohm's law, will be $C = \frac{10}{10} = 1$ empere. As the entire electro-motive force of 10 volts is expended in the three conductors, it is evident that the amount expended in each one will be proportional to its resistance. Thus the first portion of the conductor that has a resistance of 2 ohms will consume two-tenths of the electro-motive force, or 2 volts. The second, having a resistance of 3 ohms, will consume three-tenths of the electro-motive force, or 3 volts; while the third, having a resistance of 5 ohms, will consume five-tenths, or 5 volts.

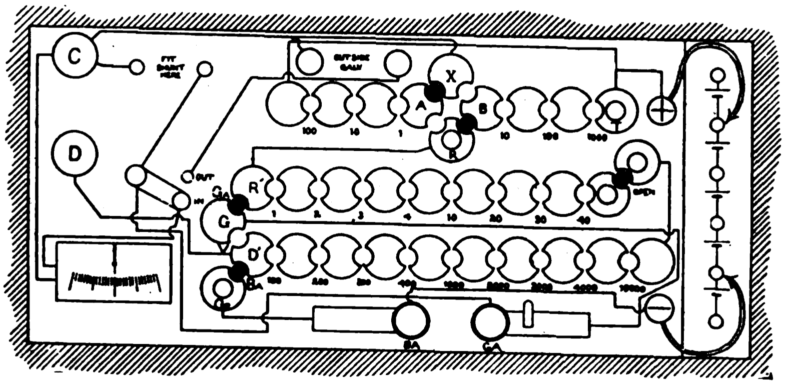


FIG. 2.—*Diagram of Coils of Portable Testing Set.*

Returning to Fig. 1 and assuming that the wires between the points *B* and *E* and the battery are of negligible resistance, the whole electro-motive force of the battery may be regarded as applied at these two points and expended in producing the current which flows through the two conductors *B C E* and *B A E*. There is evidently then the same total fall of potential along the conductor *B C E* as there is along the conductor *B A E*. It also follows from the preceding reasoning that between any two points on a conductor or pair of conductors which have exactly the same potential no current will flow. Consequently if two such points be joined by another conductor in which a sensitive galvanometer is included, the galvanometer will show no deflection and it will make no difference in any electrical conditions whether two such points be joined by a conductor or not. Imagine now that a galvanometer be provided with flexible terminals and that one terminal be moved along the conductor *B C E*, while the other terminal is moved along the conductor *B A E*. So long as the galvanometer terminals touch portions of these two conductors which are at different potentials, the needle will be deflected, indicating the passage of a current, but as soon as two contacts are made which are at the same potential the needle will return to zero and remain quiescent. For the sake of illustration, assume that the galvanometer when connected between the points *C* and *A* shows no deflection. For the sake of brevity, let us indicate the resistance of the conductor *B C* by *a*, that in the conductor *B A* by *b* and correspondingly the resistances of the conductors *C E* and *A E* respectively by *x* and *d*. Now, if when the points *C* and *A* are joined by the galvanometer it shows no deflection, it is quite evident that the current in *a* must be the same as in *x*, because, as the galvanometer shows no deflection, no current is either given to or taken away from *C*, and similarly the current in *b* is the same as current in *d*. As there is no flow of current through the galvanometer, the points *C* and *A* must be at the same potential, and consequently the fall of potential over *a* is the same as the fall of potential over *b*. Let us call the currents in the conductors *a*, *b*, *x* and *d*, respectively, C_1, C_2, C_3 and C_4. Ohm's formula, $C = \frac{E}{R}$, may be written as $C R = E$. Now, as *C* and *A* are at the same potential and as the same conductor from the battery is connected to the ends of both *B C* and *B A*, the fall of potential along the two conductors is the same. Symbolizing this fall of potential by E^1, we can write $a\ C_1 = E^1$ and $b\ C_2 = E^1$ and consequently $a\ C_1 = b\ C_2$. Similarly by the same process of reasoning the falls of potential in C E and A E must be equal, and we can write $x\ C_1 = d\ C_2$. Now, if we divide the first question by the second, we have $\frac{a}{x} = \frac{b}{d}$, which may be written in the form of a proportion, namely, $a : b :: x : d$, from which $x = \frac{ad}{b}$. Now, therefore, if four resistances be arranged in the form of a parallelogram as shown in Fig. 1, in such a manner that a galvanometer indicates no deflection when connected to the points A and C; and if of these four resistances three are known, the fourth can be calculated. In common practice it is usual to provide three resistance boxes, which may be joined in the manner shown. These resistance boxes can be varied at pleasure, and consequently by varying the resistances in a, b and d until the galvanometer shows no deflection, it is possible to find the value of x from the proportion above given. Such is the theory of the Wheatstone bridge.

Modern instrument-makers have exhibited great ingenuity and skill in arranging the several sets of resistances which are necessary to a Wheatstone bridge, together with a galvanometer and a battery in a convenient and easily portable form. Such a combination is generally known under the name "Portable Testing Set," the general arrangement of which is illustrated in Fig. 2. Referring to the foregoing equation, $x = \frac{ad}{b}$, it is seen that the unknown resistance x is equal to the resistance of the conductor a divided by the resistance of the conductor b, multiplied by the resistance of the conductor d. These three conductors, a, b and d, are usually termed the "arms" of the bridge. Let us write this formula as follows: $x = \frac{a}{b} \times d$. If a and b are respectively equal, then $x = d$, namely, the unknown resistance is equal to the resistance in the arm d.

In the portable testing set it is customary to make the portion which constitutes the arm d of a number of coils of different resistances. Refer to Fig. 3, which is a plan of the testing set shown in Fig. 2. The arm d, or the rheostat arm, as it is usually called, contains 17 coils, having the values in ohms of 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400, 1,000, 2,000, 3,000, 4,000, 10,000. The arms a and b are usually made to contain three coils each. In Fig. 3 the left-hand arm contains three coils, having resistances of 1, 10 and 100 ohms; while the right hand contains coils of 10, 100 and 1,000 ohms resistance. All of the resistance coils are contained in the bottom of the box which encloses the testing set. The terminals of each coil are brought to pairs of brass blocks mounted upon a hard-rubber slab, which forms the top of the set. In each pair of blocks a hole is drilled into which a taper plug is placed. When this plug is in place it is evident that the coil beneath it is short-circuited, and thus cut out. But by removing the plug the resistance of the coil is included in the circuit. Suppose that the 1-ohm coil be unplugged in the arm a and the 1,000-ohm coil be unplugged on the arm b; under these circumstances $\frac{a}{b} = \frac{1}{1{,}000}$. If now the galvanometer shows no current when the 1-ohm coil is unplugged in the rheostat arm, it is evident that the unknown resistance x will be equal to 1,000th of 1-ohm. If, on the other hand, the bridge arms be reversed and the 1-ohm coil be placed in the arm b and the 1,000-ohm coil be placed in the arm a, the value of d is multiplied by 1,000, and if under such circumstances a balance be obtained on the galvanometer when the 1,000-ohm coil is unplugged in d, the value of x will be 1,000 $\times$ 1,000, or 1,000,000 ohms. It is quite evident that any intermediate resistance can be measured in the same fashion.

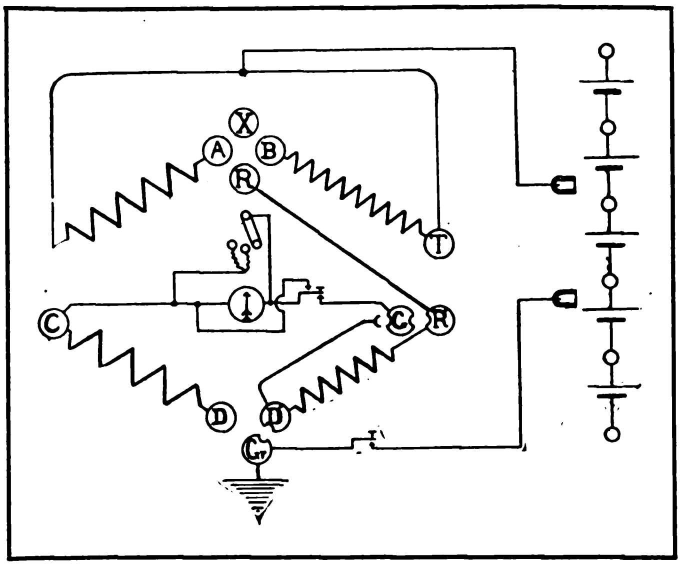


Fig. 3—Circuit of Portable Testing Set.

MR. DE WOLF'S ANSWER IN THE KELLOGG CASE

(*Continued from page 437.*)

Mr. De Wolf's answer then goes into the details of Mr. Milo G. Kellogg's efforts, unsuccessful so far, to secure the return of his stock.

About the 4th of July, 1902, Milo G. Kellogg, unexpectedly to himself and his friends, had in a measure recovered his health, and was able to come to Denver, Colo., where this defendant, together with Leroy D. Kellogg, met him and reported to him fully what had been done during the previous months; that said Kellogg neither then nor since complained that this defendant had exceeded his authority, nor suggested that this defendant had acted otherwise than in entire good faith and for what he conceived to be the best interests of said Kellogg; that said Kellogg expressed regret at the existing situation, and was exceedingly anxious to regain control of the Kellogg Company, or even a minority interest therein, and to that end used with this defendant, and later with said Barton, various arguments and persuasions. This defendant is not familiar with all that passed between said Kellogg and said Barton and others in that regard. But this defendant is informed that said Kellogg was fully advised by his counsel, Judge Taylor, that any negotiations on his part to repurchase stock from said Barton would amount to a waiver and abandonment of any possible rights which said Kellogg might have to challenge the validity of said Barton's purchase, and that, with such knowledge and advice, said Kellogg did enter upon such negotiations, but, as this defendant is informed and believes, without success. And this defendant further says that, so long as said Kellogg was in negotiation for, and was hopeful of securing either the control or a substantial minority interest (leaving the majority interest in the hands of said Barton) in the Kellogg Company, he was willing to continue and did continue the policy of silence as to the change of ownership of the stock, and only departed therefrom after the filing of the bill of complaint herein.

This defendant says that the agreement of January 4, 1902, between said Barton and this defendant, acting for said Kellogg, has been performed, and that said Kellogg has received and accepted the proceeds therefrom; that a subsequent adjustment of accounts has taken place between the parties thereto, and a full and complete statement arrived at, which was embodied in a subsequent contract dated April 22, 1903, which was executed by this defendant for said Kellogg, with the full and personal consent and approval of said Kellogg, and the consideration for said stock as provided in said contract has been fully paid.

This is practically the full text of Mr. De Wolf's answer. It is expected that the other defendants to the action will traverse the same ground if they go into the issues at any length.

A DECISION AS TO POLE TAXES.

An interesting decision has just been handed down by Judge J. A. Evans in the Pennsylvania courts in the matter of telephone poles. The suit was brought by the Borough of Braddock against the Allegheny County Telephone Company to recover a tax on poles and wires since 1897 under an ordinance. The company claimed that the fee sued for was a special assessment in the nature of a taxation, and that by the performance of the obligation as required by the ordinance and the franchise to the telephone company the license fee had been paid.

The court held that the license fee required by the borough or municipality for supervision and inspection is not a tax, but admitted that it might be an assessment in the nature of taxation. Even if the borough did intend in the original ordinance to exempt the company from all libility of license, the court questioned the power of councils to do it, as it was not a perpetual contract and is not binding on future councils. Therefore, the court argued, the councils originally intended to exempt the company from a franchise tax, but not from the pole and wire tax, which was not covered by the ordinance, and must be paid to the borough.

The Editor's Page

OPPORTUNITIES FOR AMERICANS IN SOUTH AFRICA.

TELEPHONE affairs in South Africa are undoubtedly looking up and there are distinct signs of a large demand awakening for telephonic communication in the great region which has now seen a full year's peace, and is bending all its energies toward industry and commerce instead of political intrigue and bloody war. There can be little doubt that all the South African towns and cities throughout the four great colonies will be customers during the next few years for modern telephone systems. A long distance line has recently been opened between Johannesburg and Pretoria, and should lead to a great extension of toll line service. The rates established should prove fairly remunerative, though prices rule high in South Africa. They are as follows, for three minutes' conversation: For distances up to 5 miles, 25 cents; 5—30 miles, 60 cents; 30—50 miles, 75 cents; 50—70 miles, 88 cents. In Aliwal North, a town on the border of Cape Colony which figured conspicuously in the war, it is proposed to establish a telephone system. Johannesburg, the future, if not the present metropolis of South Africa, is evidently planning a telephone system on a reasonably liberal scale. The existing system is to be extended and a cable plant is to be laid down capable of accommodating 10,000 subscribers, extending from Wolmarans street to the mines, and from Fordsburg boundary to Doornfontein and Jeppestown. It is evident that the ideas of Johannesburg on its future telephonic needs are liberal and comprehensive. It is said that the first instalment of the material for the underground conduit work has been ordered from England, and that the work of building the underground system, which it is expected will occupy a couple of years, will be proceeded with in sections, so as gradually to relieve the more congested aerial routes. Arrangements have been made for rapidly increasing the present central office equipment, which is evidently inadequate at present, and "it is confidently anticipated that by the beginning of July no public inconvenience will be felt." Which goes to show that at present the demand for telephone facilities in the gold capital exceeds the supply. American manufacturers please note.

THE NATIONAL CONVENTION.

THE outcome of the National Convention at Chicago was on the whole disappointing. This is all the more to be regretted, in view of the opportunity that existed for better things. It had been hoped that with Judge Thomas' retirement, a new policy and a broader one would be inaugurated. The election of Mr. Dougherty to succeed Judge Thomas, makes the promise of better things for the association problematical. Mr. Dougherty is an excellent man and an undoubted friend of the Independent movement, but he is not a practical telephone operator—what the association needs if it is to survive. Mr. Dougherty is a banker, and would have made an excellent treasurer, but as president, he cannot hope, even remotely, to revivify the association. Moreover, and this in itself, is a fatal handicap, he is known as one of the coterie that has ruled the association for years. To make matters worse, if such a thing was possible, the convention chose as secretary, the representative of a manufacturing concern, getting away entirely from the idea that is supposed to be behind the organization. There was an opportunity to make something of the association. We fear it has been lost. The whole election was a farce. It seems too bad that the advice of the real friends of the association could not have been followed, and a merger arranged with the Inter-State Association.

THE DIVIDED MULTIPLE—A STEP BACKWARD.

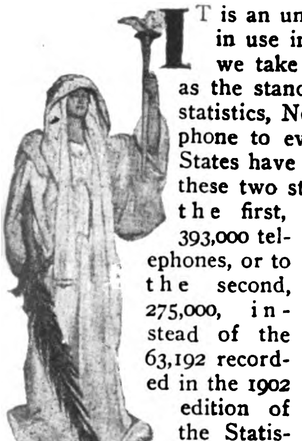
IT is passing strange that just as we have brought the working of the telephone service from the subscriber's end to the very acme of simplicity, a system should be advocated which goes back to operating by the subscriber. The divided multiple board system, described by Mr. W. Aitken before the (British) Institution of Electrical Engineers as an "efficient telephone system for the world's capitals," is a system which originated in this country and has been improved on by Mr. Aitken, who has devised circuits adapting it to central energy working. The general idea is to have very large central offices serving large districts, thus reducing the number of central offices required to serve a given number of subscribers and so reducing the local trunk equipment required. The divided multiple exchanges would be equipped with two or more multiple boards, the multiple portion of each board representing only a portion of the total subscribers connected to the exchange. But each subscriber would have a line signal and answering-jack on each multiple board and would be able to select the particular line signal he wished to operate, which would depend on the number he wanted to call—by means of a set of two or more buttons on his instrument.

In one of the proposed 45,000 line divided multiple exchanges, for instance, the subscriber would have three buttons on his instrument, say A, B, and C. Button A would operate the line signal on board No. 1, which would contain the multiple jacks for lines from 1 to 15,000; button B would energize the line signal on board No. 2, containing the multiple jacks of lines 15,001 to 30,000 and button C would govern the line signal on board No. 3, which, in addition to the multiple jacks of all lines having numbers above 30,000, would have the jacks for outgoing trunks to other exchanges. The system being worked by central energy, the hanging up of the receiver would automatically give the disconnection signal in the ordinary manner. The general opinion voiced by the discussion on Mr. Aitken's paper was that the system was experimental, that the longer average subscriber's line that would result from the very large districts proposed would more than counterbalance the saving made by diminishing the number of local trunks, and that the demand for expert operating made on the subscribers would be a very grave objection. Mr. Aitken stuck to his guns. The divided multiple system would be cheaper in spite of the longer subscribers' lines, nobody would press the wrong button, and improvements in the present type of multiple board could only postpone the day of the divided multiple board.

Time will tell whether Mr. Aitken or his critics are right, but the tendency of the present day, as well as the teachings of experience and the scientific study of the subject, are all against Mr. Aitken. In very large cities we are much more likely to abolish the multiple board altogether than to divide it. That is not quite correct, either, for we shall always need multiple sections on which to work incoming trunks, and what we are much more likely to do in very large cities in the future is not to place multiple jacks at the A positions at all, but to make the A positions simply answering positions and to complete all connections, both local and trunk, at the B positions. That style of divided multiple board is much more likely to be the system of the future than the style of divided multiple board advocated by Mr. Aitken.

TELEPHONE CONDITIONS IN CANADA

By F. Dagger, *Telephone Engineer, Toronto.*



IT is an undisputed fact that the number of telephones in use in the Dominion of Canada is very small, if we take the best telephoned countries in the world as the standard of perfection. According to the latest statistics, Norway, Sweden and Denmark have one telephone to every fourteen inhabitants, while the United States have one to every twenty inhabitants. Judged by these two standards, Canada should have, according to the first, 393,000 telephones, or to the second, 275,000, instead of the 63,192 recorded in the 1902 edition of the Statistical Year Book.

Statistics for 1901 place the proportion of telephones in the different provinces as follows:

Ontario, one telephone to 89 inhabitants.

Quebec, one telephone to 102 inhabitants.

Nova Scotia, one telephone to 122 inhabitants.

New Brunswick, one telephone to 129 inhabitants.

British Columbia, one telephone to 63 inhabitants.

Prince Edward Island and Manitoba, not recorded.

It is significant that British Columbia, where the systems are operated by local companies, free from the influence of the Bell Telephone Company, has the best record, notwithstanding the fact that in commerce, manufacturing industries and financial resources, it is far behind the Eastern provinces.

Dealing with the territory served by the Bell Telephone Company of Canada, viz., the provinces of Ontario, Quebec and Manitoba, a glance over the field will show that the sparsity of telephones is due, first, to the excessive rates charged in the cities and towns, and secondly, to the neglect to provide service except on prohibitive terms in the villages and rural districts.

TABLE NO. 1.

COMPETITION REDUCES THE COST.

Table compiled by Mr. Dagger, showing 67 cities in United States where competition has not increased rates to people compelled to use both systems:

Place.	Bell rates now. Business.	Independent rates now. Business.	Independent rates now. Residence.	Total present cost of 3 telephones.	Bell rates before competition. Business.	Bell rates before competition. Residence.	Total cost of 2 Bell 'phones before competition.	Annual saving.
Ottumwa, Ia	mostly free	$24	$12	$36-up	$75	$48	$123	$87-on most
Iowa City, Ia	$21	30	18	69	48	24	72	3
Oskaloosa, Ia	24	30	18	72	48	36	84	12
Fairfield, Ia	12	18	12	42	36	30	66	24
Tipton, Ia	18	24	12	54	36	18	54	Same cost
Hawkeye, Ia	15	15	12	42	36	24	60	18
Greenburg, Ia	30	24	15	69	42	30	72	3
Waterloo, Ia	30	30	18	78	50	36	86	8
Decorah, Ia	12	14	9	35	36	24	60	25
Cheboygan, Mich	?	24	12	36-up	30	18	48	12-on most
Benton Harbor	12	25	16	53	48	36	84	31
Adrian, Mich	?	24	12	36-up	48	36	84	48-on most
Saginaw, Mich Bay City, Mich Flint, Mich	24	20-30	12-18	56-72	42-48	30-36	72-84	16-12
Caro, Mich	24	20	12	56	48	24	72	16
Holland, Mich	12	18	12	42	48	36	84	42
Lansing, Mich	20	24	12	56	48	36	84	28
Iron Mountain, Mich	12	24-36	18-24	54-72	48	36	84	30-12
Chillicothe, O	42	24	18	84	48	36	84	Same cost
Cleveland, O	84	48	36	168	120	84	204	36
Ashtabula, O	6-up	24	18	48-up	48	36	84	36-on most
Mt. Vernon, O	15	30	18	63	48	36	84	21
Fostoria, O	18-36	24	12-18	54-78	48	36	84	30-6
Wellington, O	24	24	12	60	36-48	24-36	60-84	0-24
Zanesville, O	12-42	33	18	63-93	60	36	96	33-3
Shelby, O	18	24	12	54	36	18	54	Same cost
Barberton, O Akron, O Cuyahoga, Falls	18-42	32-36	20-24	70-104	72-90	27-48	99-138	29-36
Tippin, O	24	24	12	60	48	36	84	24
Mifflingburg, O	21	24	18	63	48	30	78	15
Washington, O	24	24	15	63	48	36	84	21
Ravenna, O	18	18	12	48	48	36	84	36
Lima, O	24	30	18	72	48	36	84	12
Sandusky, O	48	30	18	96	72	48	120	24
Kenton, O	24	24	12	60	48	36	84	24
Lancaster	24	24	12	60	48	24	72	12
Cambridge	21	24	18	63	50	36	86	23
Urbana, O	24	24	12	60	60	36	96	36
Cambridge, Pa	12	18	12	42	24	18	42	Same cost
York, Pa	15	30	18	63	60	48	108	45
Johnstown, Pa	6-36	30	24	60-90	60	48	108	48-18
Chambersburg, Pa	12	24	18	54	48	24	72	18
Fall River, Mass	90	36	24	150	125	48-up	173-up	23-up
New Bedford, Mass	48	36	24	108	96	48	144	36
St. Paul, Minn Minneapolis, Minn	24-72	48	30	102-150	120	66	186	84-36
Winona, Minn	12	30	18	60	48	36	84	24
Duluth, Minn	0-54	30	20	50-104	54	54	108	54-4
Beloit, Wis	36	24	12	72	60	24	84	12
Owensburg, Ky	42	30	18	90	60	36	96	6
Louisville, Ky	?	48	24-30	72-78-up	96	60	156	84-d'wn'ds
Lynchburg, Va	30	28	18	76	64	64	128	52
Fayette, Ind	12	30	18	60	60	36	96	36
Bluffton, Ind	24	30	24	78	48	36	84	6
Connersville	18	24	15	57	42	30	72	15
Wabash	18-36	24	18	60-78	42	36	78	18 Same cost
Columbus, Ind	24	24	12	60	48	30	78	18
Logansport	24	25	15	64	48	36	84	20
Lebanon, Ind	24	21	15	60	48	36	84	20
Michigan City	12	27	15	54	48	36	84	30
Tonawanda, N. Y	30	36	16	82	60	40	100	18
Auburn, N. Y	30-54	30	24	84-108	72	60	132	48-24
Joplin, Mo	24	24	18	66	72	54	126	60
Trinidad, Col	36	36	18	90	80	60	140	50
Grand Rapids, Mich	30	30	20	80	50-48	40	90-88	10-12

An analysis of the "Bell" report for the year ending December 31, 1901, gives the following results:

Number of telephones	42,858
Number of exchanges	343
Number of agencies	514
Estimated number of telephones in 24 cities and towns	32,000
Estimated number of telephones in remaining 319 exchanges and 514 agencies	10,858

If we deduct one telephone for each of the 514 agencies, there remain 10,344 telephones, or an average of less than 33 telephones for each of the 319 exchanges in the smaller towns and villages:

Population of Bell territory, 4,035,416.

Population of twenty-four cities and towns, 900,000.

Population of territory containing 10,344 telephones, 3,135,416, or one telephone to 303 inhabitants.

It will thus be seen that the small towns, villages and rural districts have hitherto been almost entirely left out of consideration by those to whom the duty of supplying telephonic facilities has been delegated, and this is emphasized by the fact that in some districts the people themselves have endeavored to provide their own service.

There is no doubt that the over-capitalization of the Bell Telephone Company of Canada is one of the chief causes of the high rates charged to telephone subscribers in the Dominion. It is on record that the American Telephone and Telegraph Company hold stock at par value $1,928,900, out of the Canadian Bell capital of $5,000,000 allotted, it is generally understood, to the former company for the use of patent rights, long since expired. To pay 8 per cent. on this $1,928,900 the sum of $154,312 has to be provided out of the rentals paid by the Canadian telephone users, or, in other words, an average tax of $3.60 per telephone has to be furnished over and above what is necessary to pay an 8 per cent. dividend upon the actual capital outlay upon the plant.

Another reason for the excessive charges is the fact that the telephone has passed through several stages of development since the date of the original patents, and at each stage the apparatus in use became obsolete, rendering it necessary in the larger exchanges for the company to partially reconstruct their system and install an improved plant. There being no adequate depreciation fund in existence to cover the cost of this reconstruction, and the company preferring that the subscribers should bear the burden, rather than the stockholders should have smaller dividends, the expenditure upon this work has been charged to capital account, thereby increasing the amount upon which dividends had to be earned, with the result that to-day the plant of the local systems could be duplicated for about one-third of the total capitalization and bond issues.

These facts prove beyond doubt that not only is there a present demand for a greatly increased supply of telephonic facilities, but that any Independent company could give a modern telephone service at much lower rates, and earn satisfactory profits, because their capital outlay would be very much less than the amount upon which present telephone users have to pay dividends.

The Bell Telephone Company's supporters will, no doubt, reply that the telephone is a natural monopoly and therefore competition must fail. In reply to this statement, the result of the Independent telephone movement in the United States has increased the number of telephones in use from 600,000, in 1894, to over 4,000,000 at the close of 1902, while the fact that there have been fewer failures in telephone companies than in national banks in the same period is sufficient proof of the financial success of competition.

The main question with the public, however, is whether competition in telephones tends to the advantage of the general community, and the best proof of this is to be found in the history of the Independent telephone movement in the United States.

TABLE NO. 2

BELL STATISTICS IN CANADA.

A Table compiled by Mr. Dagger, showing how poorly the Canadian field is covered telephonically by the Bell, in comparison with the United States and Norway, Sweden and Denmark.

Pro rata telephones in United States, etc.:	
United States	1 telephone to 20 inhabitants.
Norway Denmark Sweden	1 telephone to 14 inhabitants.
Pro rata telephones in Canada:	
Ontario	1 telephone to 89 inhabitants.
Quebec	1 telephone to 102 inhabitants.
Nova Scotia	1 telephone to 122 inhabitants.
New Brunswick	1 telephone to 129 inhabitants.
British Columbia	1 telephone to 63 inhabitants.
Number of Bell telephones in three Canadian provinces:	
Number of telephones	42,858
Number of exchanges	343
Number of agencies	514
Estimated number of telephones in 24 cities and towns	32,000
Estimated number of telephones in remaining 319 exchanges and 514 agencies	10,858
Deducting 1 telephone for each agency, leaves in territory outside of 24 cities and towns	10,344
Or an average of less than 33 telephones for each of the 319 remaining exchanges.	
Population of entire Bell territory in Canada	4,035,416
Population of 24 cities and towns	900,000
Population of territory containing 10,344 telephones	3,135,416
Or only 1 telephone to each 303 inhabitants.	

In 1894, before the advent of competition in telephones, the Bell Telephone Company of America had less than 238,000 subscribers' stations, with a total output of 582,000 telephones, the result of nearly twenty years' undisputed possession of the field. On December 31, 1901, seven years later, the figures were:

Bell telephones, 1,020,647 stations; Independent telephones, 1,250,000 stations; total, 2,270,647 stations.

The following are the figures for the States of Ohio, Michigan and Indiana:

Ohio.—Bell telephones, 1894, 17,724; 1901, 79,500. Independent telephones, 1894, nil; 1901, 106,344; farmers' telephones, 13,438.

Michigan.—Bell telephones, 1894, 15,025; 1901, 48,930. Independent telephones, 1894, nil; 1901, 33,731; farmers' telephones, 5,753. Michigan Bell Telephone Company in receiver's hands through cutting rates in their effort to kill competition.

Indiana.—Bell telephones, 1894, 6,000; 1901, 35,000. Independent telephones, 1894, nil; 1901, 65,300; farmers' telephones, 16,353.

The records of the other States show a similar increase since 1894, but space prevents the publication of the figures in detail. The following statement by a well known authority in the Independent field will, however, convey some idea of the marvelous development: There are at the present time in operation in the United States over 5,000 Independent telephone exchanges. A further proof of the immense growth of the Independent telephone work can be found in the fact that the combined output of the Independent manufacturers during the year 1902, according to the report of sales, shows an average daily output during the entire year of 1,500 telephones, or practically 550,000 telephones for the year. These are figures which can be substantiated. If this is what was accomplished last year, it is not difficult to appreciate that the sales of preceding years would easily make up the difference required to give us an estimated total number of two and a half million telephones now in service."

"It seems almost beyond belief to the uninitiated, but a careful and conservative review of the financial affairs of the Independent telephone industry, covering a period of the last eight years, will show a most favorable condition. As heretofore stated, the percentage of failures among our national banks has been greater than in Independent telephone investments. And when one stops to consider that around the banks of this country is thrown a protective law, which should at least reduce to a minimum any question of failure, the claim of our common enemy, that we are a lot of dreamers, and that our work could not live, is idle, and considering the $300,000,000 or more now invested in the Independent cause, we have, from a financial standpoint, the best of the argument."

The people have suffered long for a service which might have been furnished by the Bell Company years ago.

This statement in the accompanying table is made up from a total of 71 completed returns received from the Independent companies in the towns named.

In 45 towns, two business telephones can be had for the same amount, or less, than was formerly charged by the "Bell" for one. In two towns the increased cost is only $1, and in one town $3, and in eight towns $6; one town $10, in three towns (including Cleveland), $12, and in one town $18.

The increased demand for telephones has widened the field for inventors in the various branches of this art to an extent which would not have been possible during the continuance of the monopoly. It is also obvious that the Independent telephone companies have provided employment for many thousands of people, who would otherwise have been forced into the ranks of other trades and professions, some of which are already overcrowded.

Taking all these facts into consideration, it is not to be wondered at that companies are now seeking to enter the field in Canada, in competition with the Bell Telephone Company, and it may here be stated that only by the encouragement of competition on a sound and legitimate basis can Canadians hope to end the existing unsatisfactory state of the telephone service in the Dominion.

As a matter of business, between the people and the companies, let those of the latter, who will provide the best service at the lowest cost, be given every facility by the Government and the municipalities to fulfil the requirements of the public. The benefits which have resulted from competition in all parts of the world are such that Canadians cannot afford to allow the telephone service to remain any longer in the undisputed control of a monopoly which has proved itself to be either unwilling or unable to satisfy the reasonable requirements of the people.

EDITOR'S NOTE.—This article taken from the *Canadian Engineer.*

SOME METHODS OF CONNECTING EXTENSION INSTRUMENTS—II

By A. Dallam O'Brien.

In Fig. "1" is shown a method of connecting a main and extension instrument which is adapted to meet a number of requirements. The lines from the central office are connected as usual to the main instrument. A switching key and hand generator are mounted at some convenient point near the telephone.

From terminals "1" and "3" on the main set a pair of wires is run to the inner or normal contacts of the switching key, and from the long spring of the key a pair of wires is run to terminals "1" and "3" on the extension instrument. It will be seen that the pair of wires from the central office is continued to the extension through the medium of the switching key. A wire is run from one terminal of the hand generator to terminal No. "2" at the extension, the other terminal of the generator being connected to one side of the line, as shown, the connection preferably being made at the normal spring of the switching key, thus avoiding the necessity of splicing to a wire and at the same time insuring a good connection by means of a soldered joint at the normal spring. By this arrangement both the main and extension instruments are able to signal the central office, the main instrument only responding to incoming calls.

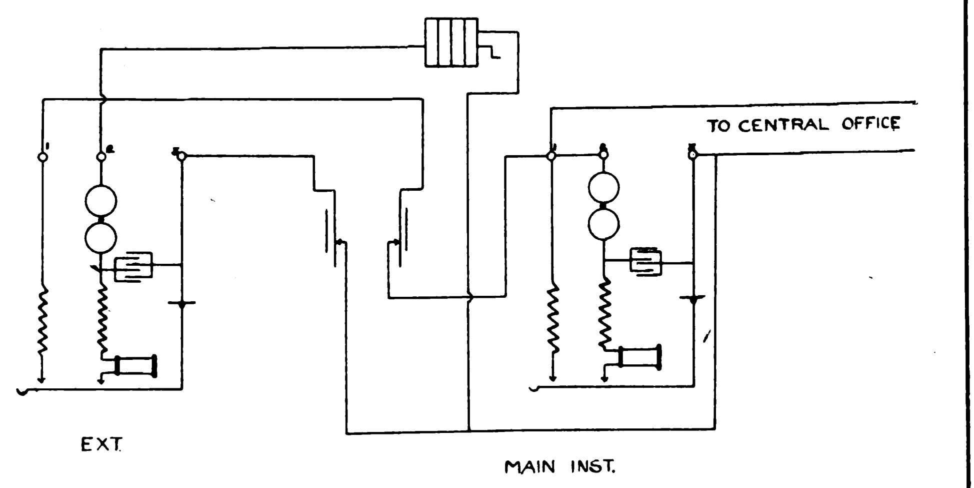


FIG. 1.

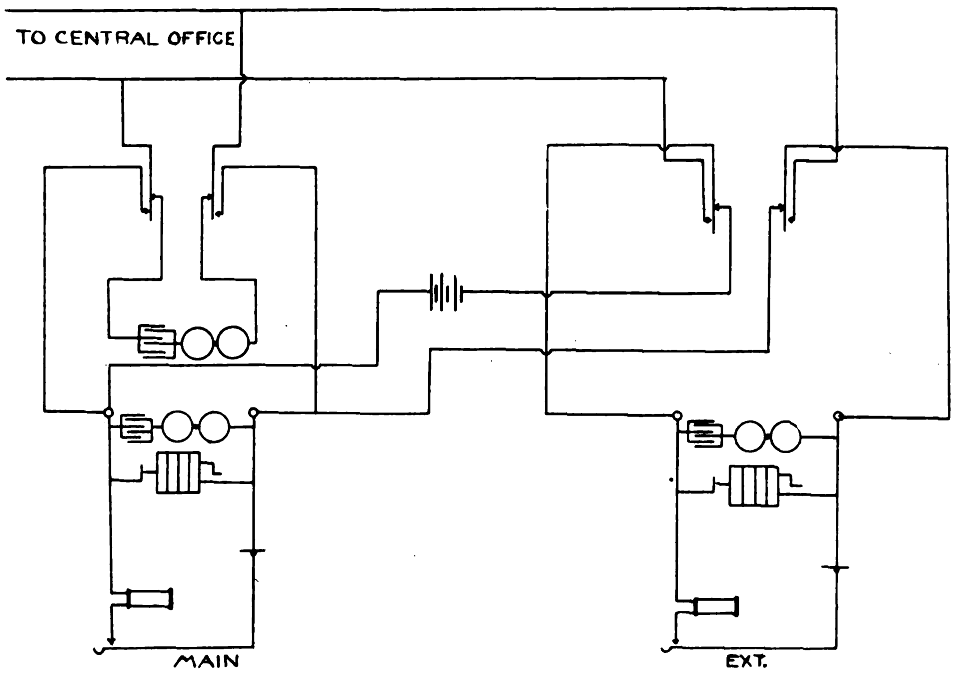


FIG. 2.

When a call is received at the main instrument which is intended for the extension station, the extension can be signalled by means of the hand generator, and, upon answering, is connected through to the central office, as shown in the figure.

The main station can, at all times, cut out the extension by throwing the switching key, and thus absolute privacy is insured at the main instrument when necessary. Conversation can be held between the two stations only with the assistance of the operator at the central office, who furnishes the necessary current for talking purposes by means of a switchboard plug. It will be readily apparent that with the assistance of the operator the extension station can signal the main station and carry on conversation.

In Fig. "2" is shown a method of connecting two instruments to a single line, whereby all incoming calls are received on one instrument, at the same time allowing both instruments to signal the central office and also signal each other, and to hold conversations between themselves without the aid or knowledge of the central office operator. Each instrument is provided with a switching key, as shown. The line wires from the central office are connected to the long spring of the key at the main instrument and to the outer springs of the key at the extension. The normal or inner contacts of the switching key at the main instrument are wired in series with a condenser and bell, as shown, thus bridging the condenser and bell across the central office line when the key is in its normal position and in this way allowing the central office operator to signal the station. The outer contacts of the key are connected to the line terminals of the instrument, so that when the key is thrown and the long springs and outer contacts brought together, the instrument is bridged across the central office line so that the removal of the receiver from the hook closes the line circuit and signals the central office. At the extension instrument the long springs of the switching key are connected to the line terminals of the instrument and from the normal contacts of the key a pair of wires is run to the line terminals of the main instrument, a battery being included in the circuit of one of them, as shown in the figure. When the extension instrument wishes to signal the central office, the switching key is thrown, bringing the long springs and outer contacts together and thus bridging the instrument across the line, so that the removal of the receiver from the hook signals the central office operator. Both instruments are provided with hand generators and bells, and when one station requires to call the other the signal is given by means of the generator which sends current over the line to the switching key, thence through the bell at the required station and back through the switching key to the calling instrument. When one station signals another it is necessary for the ringing current to pass through the battery which is located in one side of the line between the two instruments. This, however, will not affect the ringing, as the battery is of low internal resistance; neither will it in any way affect the battery.

The called station having answered and the telephones being removed from the hook at both stations, battery flows through the two instruments in series, and conversation is carried on in the usual way. Where the distance between the main and extension station is not great, two cells of any good wet or dry battery will answer for talking purposes. The ringing generators at the stations should be provided with an automatic device for opening their circuit when not in use. The bells should be equipped with condensers. There is no reason why the ordinary common battery instrument, using an induction coil, cannot be used.

The arrangement shown in Fig. "3" does not, strictly speaking, come under the head of a method of connecting extension instruments, but as it is in reality an extension system to the central office and has been used to a large extent by the Bell Company, it will be of interest. The two stations and the lines connecting them form a private line, the talking battery for which is furnished by the central office. This private line may be and often is of considerable length and may include a number of instruments, in addition to those shown, being connected by bridging them across the circuit. The instruments themselves consist of a transmitter and receiver wired in series and mounted on a suitable telephone box, which contains a hand generator, condenser and polarized bell. For each private line there is provided at the central office a retardation coil, which consists of two windings on parallel spools and having a continuous core of soft iron wire, which passes through the centre of the spools, the ends being joined on the outside. Each winding has a resistance of about twenty ohms and an impedance to the alternating current of the frequency generated by the ringers of about 1,000 ohms. Leads from the buss bars of the central office batteries are connected to the windings of the coil, the free end of the windings being connected to the pair of wires that runs from the central office to the private line. This pair of wires is usually run to some point of the private line nearest the central office and there the battery leads are spliced to the line wires. The effect then is to bridge the talking battery at the central office and the windings of the retardation coil across the private line.

When one station desires to call another, use is made of the hand generator in the usual way, and the current passing over the line rings all the bells connected in bridge across it, thus making it necessary to use signals when there are more than two stations on a line. If the retardation coil was not placed in the bridge with the battery, the ringing current, following the path of least resistance, would complete its circuit through the storage battery at the central office and sufficient current would not pass through the bells bridged across the line to ring them. The high impedance offered by the retardation coil to the ringing current prevents all but a small portion of the current from passing through the battery and thus allows the various stations to be signalled; the resistance of the coil to the direct current of the battery is not large enough to prevent the talking current from flowing over the line and through the instruments.

This arrangement of a private line is most efficient and most easily cared for and puts the battery in the central office, where it can be taken care of to the best advantage.

Where a number of private lines of this character are operated it is usual to mount all the retardation coils for such lines on a board fastened to the wall in the terminal room and to mount on this board buss bars, which are directly connected to the main buss bars of the storage battery. The retardation coils are then connected to these local buss bars by means of a cable of switchboard wire, a fuse being included on the positive side of each circuit. The free terminals of the retardation coils can then be readily connected to the outgoing battery leads by means of a switchboard cable run to the main distributing frame.

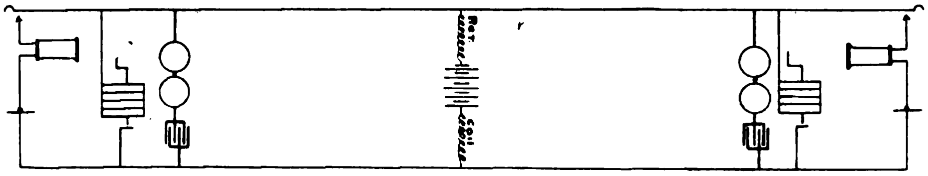


FIG. 3.

THE TELEPHONE AND TRAIN DISPATCHING

At the last meeting of the Pacific Coast Railway Club, the principal subject of discussion was the question, "Can the present method of train dispatching be improved, and how?" In reply to this, a letter from B. A. Worthington was read and proved to be very instructive as well as interesting.

After outlining the present method and suggesting minor improvements for the bettering of the system, the letter discussed at some length the use of the telephone instead of the telegraph for transmitting train orders. Mr. Worthington said in part:

"As to whether the present method of train dispatching can be improved by the use of the telephone, movements in this direction have already been made in the East, the Illinois Central Railroad Company having established a telephone system comprising an extensive long distance line, with copper circuits, the present connection being between the general manager's office and the offices of the different superintendents on the system, the farthest office being 915 miles distant from the general manager's office. The line is not cut in at local offices, but is used entirely for long distance service, in order to get quick connection with the various division centres. No doubt this line could be cut into short sections, if necesasry, to correspond to the different operating divisions, and the telephone line could be used locally for train movements. There seems no good reason why, if the business could be handled with the same care and safeguards that are given the present telegraph system, that the telephone should not be equally efficient.

"I believe the details of the train orders, with proper safeguards for transmission over a telephone line, could be worked out, as under the present system, train orders are repeated back by telegraph to the dispatcher issuing them; and, while the present telephone system is not as accurate in the transmission as the Morse telegraph, yet, with the improvements that are constantly being made, I am satisfied that the time will come when the Morse system will be entirely abolished in the handling of trains and a telephone system substituted.

"Some new electric lines in the East, which are becoming so plentiful, and which are gradually being merged into lengthy lines, use the telephone system for train dispatching. On most electric lines the positive meeting point is in use, conductors obtaining their orders at meeting points where there are no regular operators. As a rule, however, there are regular agents at such points who obtain the orders, although there are numerous meeting points on such lines where there are no agents. At such points there are telephone boxes, to which the conductors have keys, and where they can procure orders for themselves. Electric lines using this system claim that they find it very convenient.

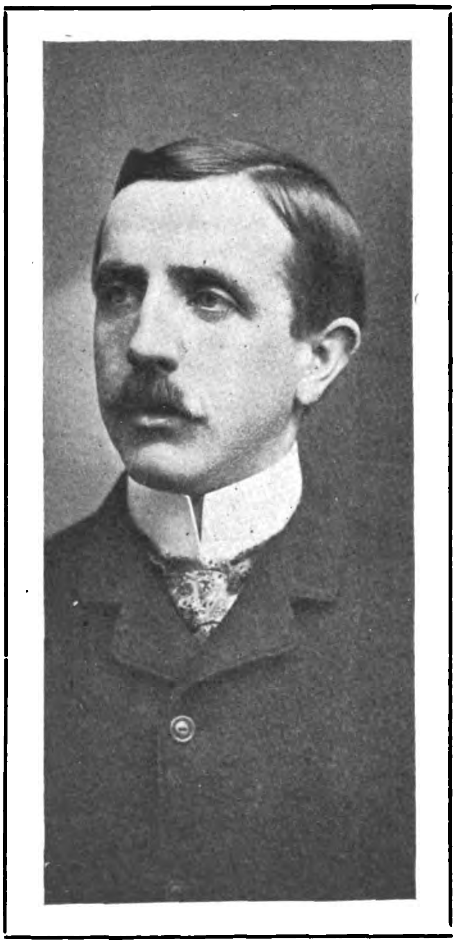
"I understand also that the Albany and Hudson Railroad Company uses the telegraph for dispatching trains, and uses the telephone at points where the trains happen to require orders, and where there are no agents, the conductors obtain the orders in the manner described by having a key to the telephone box; but the company uses the telephone simply as an auxiliary to the telegraph, and not as their main reliance.—*Telegraph Age.*

UNIFORMITY IN TOLL SERVICE*

By F. M. Potter.

THE power vested in this association to assist in establishing a uniform method of conducting the telephone traffic in this State is the very germ of its strength and vitality.

Exchanges have existed and flourished without the support of this body, but no exchange can presume to achieve ultimate success without outside connections. It is, however, only with the construction of these metallic toll sinews that we realize the benefits and assistance of our fellow workers and of the strength that exists in the whole fabric when strongly welded link by link. Our successes or failures are reactive upon all alike, and we must act uniformly and harmoniously would we derive the full benefits of our organization. It is with this feeling that I solicit your consideration and co-operation and that I present my plea for uniformity.


F. M. Potter.

In the requirements of toll service we all acknowledge that we should have the best of line construction and of apparatus. The fact that many of our earlier lines and many of those now operating are not up to modern standard, and instruments that should only be used for local work are expected to fulfill the requirements of good toll service, should bring us to a vigorous awakening, to the need of a general betterment of modern metallic construction and standard toll apparatus.

Do we build our lines heavy enough, of sufficient capacity to accommodate the demands of service? Are we actually creating a use and demand for our service by a penurious belief that a single line should do double or triple service? With your pole line constructed, perceive the small relative cost of an extra circuit or two and of the increased utility and value where prompt service is obtainable.

The devisement of a perfect system for the practical and economical handling of toll business is the vital question for your immediate thought and your immediate action.

A system to be effective and satisfactory must be governed by certain fixed rules, which obviously must be clear, concise and readily applied in practice.

We must first determine upon a basis for our tariff charge. In the past almost every conceivable plan has been suggested. The Bell rates were originally established to meet the competition of the Western Union. Later they were based upon a fixed rate, with the mileage determined from the railroad distance between stations. This was a compromise between the mileage based on pole line and the air line distance, both means being deemed unfair at the time of their sparsely constructed lines. We have seen many Independent companies establish a fixed rate to this station and to that, a rate out of all proportion to either the cost of the line or the distance traversed. But when remote stations were cut through for service, and these stations multiplied, it brought about conditions which can only be relieved by some genral action working equitably and harmoniously with all interests involved.

Let us, therefore, drop our primitive methods at once; let us demand that this association establish a State traffic committee, with power sufficient to put into operation at once a practical system—a system that will remove any obsolete and antiquated methods—and set us aright on the road which by the traffic conventions of the American Bell Telephone Company, the large Western toll line companies and traffic associations have proven to be the best. We are not pioneers in this field, hence let us profit by the costly experience of others.

How then shall our rates be established? They must necessarily be based upon the distance traversed, the time consumed. Our unit of distance is naturally the mile. As the irregular, circuitous pole line affords no fair or practical unit, we must take the air line distance, so readily computed by map. The limit of time would naturally be that period consumed in the ordinary conversation. If you have given any thought of observation to this matter, you must know that the most suitable value is not five minutes, as most of us are now charging, but three minutes, the duration allowed by those of long experience and capable judgment.

In the determination of the proper units the practice elsewhere should be considered. The rapid strides now being made in extending toll service will shortly carry us beyond the bounds of our own and even adjacent States, and our rate should be so carefully selected that when we expand to interstate traffic the rates and apportionment will harmoniously attune.

In California a rate of fifteen seconds has been introduced and has educated the people to rapid use of service and also has proven quite successful. One minute rates have been established, but failed through no defect, however, of the rate itself. The rates now in general practice are based upon the general schedule prepared by the American Bell Telephone Company at its rate convention, when the rate conference determined upon the use of one-fifth of one cent per mile per minute. This would equal three-fifths of one cent per mile for a three-minute conversation. Some of our traffic associations in the West have determined on two-thirds of one cent or an increase of one-fifteenth.

It was not more than four years ago that the Bell Company changed from a five to a three-minute basis. Since then the Independents have rapidly fallen in line, and it is now generally conceded that this three-minute period is fair and satisfactory. In applying this rate to short local lines, you probably perceive that a fixed sum of, say ten cents, must be the minimum charge for five miles or under, and that in every case where fractions exist the rate is made to the nearest multiple of five. In the establishment of a fixed rate a provision might well be made for a special rate for night and Sunday service upon all toll calls amounting to not less than 25 cents. Overtime should be charged for in every instance, for it is a grave injustice to default in excess time where it works to the injury of all companies involved.

The rate determined, a method of application to practice will be supplied to the stations and companies in need of the same. An accurate and comprehensive map, suitable for this work must be determined upon. (The United States Post Road Map is just the thing and is easily obtained.) With the list of actual connections distinctly set forth thereupon and the transfer stations properly designated, it is with greatest ease that the predetermined scale is applied and the rate instantly secured. Rate sheets from any to every other station can now be freely supplied to minor stations. In its application you may deem it wise to limit the minimum charge to 10 cents and to grant to local exchanges the privilege of establishing special rates for distances of twenty-five or fifty miles, providing, however, that the traffic scale shall affect all regular toll service, either originating or terminating outside of the radius prescribed.

Having determined upon a uniform and practical method of determining rates, it now devolves upon us to apportion these rates equitably among the parties whose stations and lines have produced this value. The method now in general practice, both by the Bell and Independent companies, is to grant to the ema-

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*Paper read at the convention of the New York State Independent Telephone Association, Utica, June 10.

nating station a certain commission on the toll charged; the balance after such deduction is to be divided pro rata in proportion to land air line mileage traversed between points of origin, transfer and destination.

Some plan of general and rapid settlement is now necessary. Any two stations can readily effect a settlement for traffic from one to the other, and this they should do, but it is a most impractical task for any company to adjust its accounts with every other company without the assistance of some traffic exchange or clearing house. Each company should report promptly, upon proper slips, and reports supplied by the clearing house, for all business between connecting companies, to be checked, corrected and balances adjusted and settled by draft. This system, when established and invested with proper authority to perform the functions of a clearing house, is exceedingly simple.

Let our records, our books, checks, slips, scales, maps and our methods be made uniform, and our toll proposition will develop amazingly in simplicity and value. We need the most careful guidance to build strongly and to build well, and we need at once assistance as will produce a uniformity of practice in this most important field of toll service.

If then, as I have shown, all that good toll service involves is as vitally dependent upon the guidance of a competent, experienced traffic committee, our policy is clear. We must act at once and secure such a plan as will bring us immediate relief. With this end in view, I would therefore present the following resolution for your consideration and move its adoption:

***Resolved,* That the Executive Committee, acting in conjunction with the president, be empowered to arrange a schedule of toll rates and their apportionment between the various companies, and be it further**

***Resolved,* That all Independent companies operating in this State be apprised of such schedule and basis of division of tolls as soon as determined upon by the Executive Committee.**

NEW YORK STATE DEVELOPMENT*

By Charles O. Harris.

In the last year great strides have been made in the development of Independent interests in New York State. Since July, 1902, the number of new companies organized was 52; number of companies chartered, 43; number of exchanges constructed and extended, 38; number of exchanges opened, 32; number of miles of toll lines built, 250; number of companies increasing capital stock, 8; total number of towns and cities having Independent exchanges in New York State, 326.

Utica has now an Independent exchange consistent with its destined growth, and one calculated to serve the citizens of Utica for some time. The builders of the exchange having in mind the time-worn phrase, "Pent-up Utica," have wisely builded large enough to be relieved of any such condition.

Buffalo, after a hard fought battle with one of the best Bell telephone companies in this State, has opened its Independent exchange and is rapidly connecting its subscribers.

Warsaw, Canandaigua, Medina, Geneva, Penn Yan, Ithaca, Jamestown, Elmira, Schenectady, Albany, Troy and over two hundred other cities and towns in New York State are enjoying Independent telephone service of a high character and have all joined the ranks of live, up-to-date Independent exchanges, and the end is not yet in sight.

The past year has witnessed surprising activity in the building of lines throughout the State, and the year 1903 promises a still greater development.

The Bell Company has done everything it could to hamper Independent development. One of its moves is the practice of organizing in the smaller towns of the State so-called Independent companies and then making contracts with them for toll line service. These contracts are for any number of years, and they will go so far as to advise the company to install Independent apparatus, with the exception of the transmitters and receivers, which are rented to the local company for as low as $1 per year. It is to the interests and is the duty of every Independent telephone man in the State of New York to individually see at once that his territory is either occupied by himself or a bona fide Independent telephone company, and to combat at every stage of the game the efforts of the Bell Company to complicate the situation by introducing a foreign element of entanglement and obstruction.

Chas. O. Harris.

The Independent telephone movement is approaching the zenith of its development in this State and the coming year will witness a greater and more profitable increase in the number of exchanges.

Considerable progress has been made in the matter of toll line service and the territory is being enlarged very rapidly. The atmosphere, which was exceedingly cloudy at our July meeting, has been greatly cleared by the action of the two toll line companies in getting together as they have, and these companies that are now enjoying Independent toll line service begin to have hopes that the day is not far distant when the entire State, from the lakes to the ocean, will be covered with a network of Independent lines and through them connection with other States.

In connection therewith I cannot refrain from emphasizing the oft repeated phrase, "Build wisely." The outlook for business was never better. The character of the material and apparatus on the market is of the highest, and labor is more skilled every day the work progresses. Coupled with this fact there is more information regarding the manner in which telephone work should be done than at any time in the past twenty-five years. Avail yourselves of it and let us show what we can do. Hop poles with porcelain knobs for insulators, with iron wire on grounded circuits, far from constitute first-class construction. Copper is a little high at present, but even at the present price, 16½ cents, it is a wise investment to string it. It is earnestly hoped that before another year passes some steps will be taken towards standardizing the line construction at least.

A step in the right direction may be taken now by using nothing less than 25-foot poles, 6-inch top, 6-pin crossarms and No. 12 copper wire; all circuits metallic, equipped with no less than 1,000-ohm bridging bells.

The very fact that some of the Bell companies operating in this State have several lines of the "hop-pole" construction, with the result that the poor deluded suscribers to that service are obliged to go to the exchange when they want to use long distance service, ought to be a warning to our Independent brethren and convince them that the only way to get and hold your subscribers is to give them good service in everything that the words imply.

In closing I wish to express the wish that the coming year of the association will witness the realization of our fondest hopes, viz., an Independent telephone in every house, store and factory in New York State.

GIVES OUT THIS MENU BY TELEPHONE.

An enterprising restaurant owner of Hazleton, Pa., has adopted a novel method of advertising. Every morning he calls up a score or more of his regular customers and informs them in detail of his bills of fare for the day. His enterprise, it is said, produces considerable trade, but the recital of the list of good things has a tendency to arouse epicurean longings in the minds of the telephone exchange operators.

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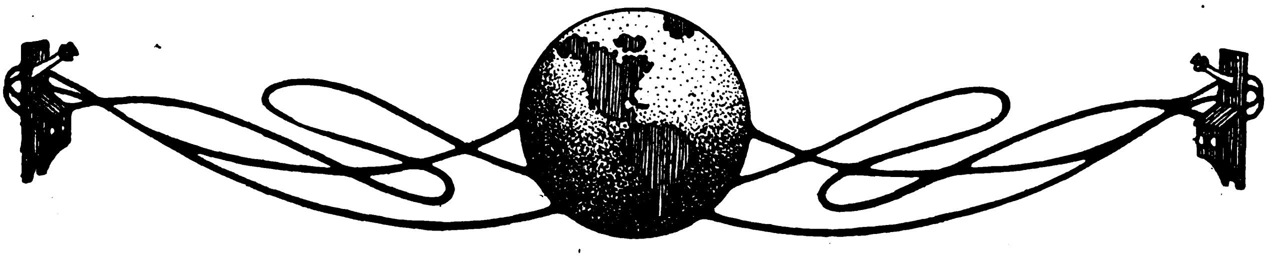
*Read before the Utica Convention of the New York State Association.

FOREIGN CURRENTS

By "The Arrester."



THE discussion on the paper by Mr. Aitken at the Institution of Electrical Engineers on "Divided Multiple Switchboards," brought out a general consensus of opinion that the divided multiple system hardly offered the true solution of the problem of efficiently telephoning the world's capitals. The discussion was opened by Mr. Herbert Laws Webb, of New York, who thought that all telephone men would find the paper of great interest and must admire the ingenuity displayed by Mr. Aitken in adapting the selective signaling circuits to common battery working. He thought, however, that Mr. Aitken was working in the wrong direction as regards the important question of capital cost. The divided multiple system would reduce the central office investment, but, by reason of the large areas to be served, would increase the line investment. As the line plant represents the larger proportion of the capital cost of a telephone system, a condition much accentuated in large cities where the cost of underground work is much heavier than in smaller places, he thought that would bar out the divided multiple system on the question of capital cost alone.

Another Serious Objection.

ANOTHER serious objection of a different order, Mr. Webb thought, was that the divided multiple system put back the operating of the service into the hands of the public. With the common battery system, the subscriber has to do no operating, the necessary movements of the telephone automatically give the necessary signals. But with an instrument where there were two or three buttons to choose from, many users would often use the wrong button. Then what would happen would be something like this. The operator on hearing a number that she cannot reach, would say "You've pressed the wrong button." The caller says "What?" because a subscriber always says "What?" to anything unexpected over the telephone. The operator gets a little impatient, and says with emphasis, *"You've pushed the wrong button."* Whereupon the caller lets go and says, "Oh, d—— your old buttons. Why can't you give me my number?" In a system of 115,000 stations, Mr. Webb pointed out there would be a daily traffic of over a million calls. A large proportion of those calls would be sent by non-experts, there would be many mistakes and much confusion and waste of time and work. In large telephone systems the peculiarities of the public must have most careful consideration.

Mr. Webb Again Differs.

MR. WEBB also differed from Mr. Aitken in his valuation of local and trunked calls. Mr. Aitken put down a trunked connection as the double in time and work of a local connection. Mr. Webb claimed that in America with uniform common battery working a trunked call was only about one-third more than a local. This modified one of the principal arguments in favor of the divided multiple system—the cost and complication of trunk working. In America generally, and in New York particularly, the problem of handling large numbers of subscribers had been greatly simplified by the extensive adoption of the private branch exchange system. By means of private branch exchanges large numbers of telephone users were served by comparatively few lines.

Mr. Kingsbury Lacks Confidence.

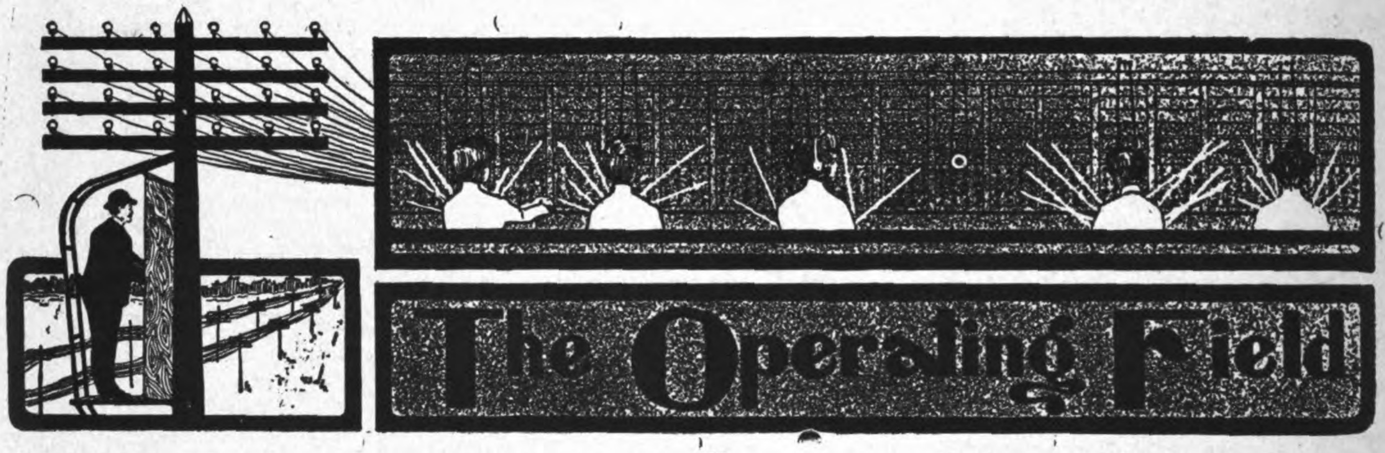
MR. J. E. KINGSBURY, one of the new Vice-Presidents of the Institution, could not profess too much confidence in the system. There was danger of the meeting taking too seriously what was only an experiment, and the world's capitals were the last places in the world that any of them would care to make the subject of experiments—telephonic. Still we needed all the invention we could get, and it might be that we should ultimately have to ask the public to do part of the work of operating now done in the central office; but every other resource should be exhausted first. It might be that we should have to have a series of switchboards, red, white and blue, say, with corresponding red, white and blue buttons for the subscribers. Selective signalling was not a new thing. By utilizing the opposite polarities of the battery, two separate signals could be worked independently, the instruments having a white and a black button. With metallic circuit lines we could have four selective signals on a line and a system of four sections or divisions of switchboard could be devised.

A Mistake of Engineers.

MR. KINGSBURY thought that the telephone engineer was sometimes apt to idealize the individual telephone subscriber. The police distinguished between its treatment of individuals and of a crowd (Mr. Kingsbury was referring to the London police—the New York police he evidently does not know), and the telephone engineer, for purposes of his own, did the same thing; he gave the individual subscriber the intelligence of a senior wrangler while taking telephone users in the mass no such standard could be applied to them. The working of a system would depend on the general conduct of the mass, not on that of the intelligent individual whom the telephone engineer might have in mind. Mr. Kingsbury thought the time had hardly yet arrived when we need seriously consider having recourse to the divided multiple system. The divided multiple board was first proposed by Mr. Kellogg about ten years ago and the limit of the multiple switchboard was then about 6,000 lines. The possibilities of the multiple board had expanded and to-day it could cope with 20,000 lines in one board. The march of improvement was so rapid that to-morrow it would perhaps be able to deal with 30,000, and even that figure might not be the topmost limit.

Mr. Aitken Replies.

MR. AITKEN made a brief reply. He had anticipated the objection to increasing the line plant and also the objection to entrusting the subscriber with a choice of several calling buttons. An estimate prepared for a system actually proposed to be built showed a saving in capital cost in spite of the increased average length of the subscribers' lines. As to the "wrong button" bogey, he thought too much had been made of it. Business men were constantly in the habit of pushing buttons to call clerks and they did not waste their time by pushing the wrong button; nor when one went shopping did one go to the wrong shop. (Mr. Aitken must be lucky in his shopping). The multiple board had expanded, but he thought that even the 3-10ths inch jack could only postpone the day of multiple divided boards.



INDEPENDENTS GAINING A FOOTHOLD IN MASSACHUSETTS.

IN Massachusetts, the home of the telephone monopoly, a few small Independent systems have been started and are successfully fighting to gain a foothold in the smaller towns of the State. These small companies are the forerunners of larger Independent systems to come, until finally Massachusetts and the entire New England territory will be as thoroughly supplied with cheap and good telephone service as the rest of the country is today.

One of these companies is the Farmers' Mutual Telephone Company, of Norton, Mass., which was incorporated September 25, 1902, with a paid-up capital stock of $10,000. It is backed by business men of the town, and has had quite a struggle with the Bell Company for existence. The Bell Company resorted to every means in its power to smother the Norton company, but without success. It even bought over one of the principal directors of the company, who is now working against the company which he helped to organize. But the other directors and stockholders are firm and loyal to the Independent cause, as also are the citizens of Norton and of Bristol County, in which the company operates.

In the prospectus which the company issued when it was first organized its object and plans are stated as follows:

"The cost of our telephone is to be so reasonable that we anticipate that you can be able to communicate with any part of the town. Before long, if you give us your patronage, we fully expect to be in connection with new lines now projecting to Taunton, Boston and probably further. This is not our main end, however. It is to have a perfect local service and incidentally to be able to communicate wherever we wish.

"Our plan is that you buy two shares of stock at $25 each. These shares, representing a telephone, entitle the owner to one vote in the company and the ownership of a telephone."

A. M. Round, M.D., president of the company, in a letter to THE AMERICAN TELEPHONE JOURNAL, says the outlook now is exceedingly bright, as the Bell Company has about exhausted all its schemes for driving the company out of business. The other officers of the company are Alfred W. Wild, treasurer; Wm. E. Payson, clerk, and F. A. Clapp, superintendent.

HOW FARMER LINES IN OHIO OPERATE.

PROBABLY the most surprising thing about the Independent telephone movement has been the avidity with which the farmers have taken to the use of the telephone. Where the farmers cannot induce the telephone company already established to give them service they now go to work and organize an Independent company and construct their own system.

Frank B. Reiter, of Mt. Corey, Ohio, gives some interesting facts as to the operation of the farmers' systems in his section of the country.

"Our plan of operating," says Mr. Reiter, "is as follows: An enterprising town or village is selected for the central office and all company meetings are also held there. Lines are run in all directions from the central office, each line being a party line, with from four to seven parties, although five and six is the number set by our by-laws for each line except in extreme cases.

"The patrons on each separate line represent a company, which selects one of its stockholders—each party being a stockholder—to represent it in the general company. All line companies are controlled by the general company.

"In our general company we have a president, vice-president, secretary and treasurer, also a board of trustees composed of five members.

"In the matter ot construction it is the duty of the board of trustees to have all lines measured and staked where poles are to go and thus determine the number of poles, cross-arms and pins or brackets required to construct all lines, and then determine the number of poles, etc., each man must furnish to construct the entire system. In the matter of wire, this can also be divided up equally among all; or probably a better plan is to let each line or individual company furnish the wire for its own company, each party sharing alike. A good plan is to have each individual company furnish the general company at least 100 pounds of wire, to be held in reserve for the purpose of constructing connecting lines to connect the central office with the central office in other towns.

"Free exchange is given between all these central offices, thus completely connecting large districts, and any patron of any individual company can talk with a patron of any other individual company free.

"By having say five patrons on each individual line and having say forty or fifty such lines, it gives one a chance to talk with 200 or 250 different parties, and if connection is established with say from five to ten other villages having a like number of telephones, one can talk with from 1,000 to 2,500 people."

WHAT INDEPENDENTS ARE DOING IN NEW ENGLAND.

VICE-PRESIDENT and General Manager Lewis A. Goudy, of the North-eastern Telephone Company, of Portland, Maine, is meeting with much success in his efforts in the New England States to get franchises for his company. The Bell Telephone Company has finally awakened to the fact that Mr. Goudy and his associates mean business, and that the Bell monopoly in New England is on the wane. Mr. Goudy is appearing before town councils at the rate of two or three a week, and much space is devoted in the local newspapers to the hearings he receives. Considerable sarcastic comment is indulged in at the expense of representatives of the Bell company, who invariably also appear before the councils with Mr. Goudy.

A hearing was set for the Bell representatives before a comitttee of the town council of Camden, Me., recently. Mr. Goudy had previously appeared before the committee and had made a very favorable impression after fully explaining what his company proposed to do. But when the time came for the Bell side of the hearing, its repreesntatives were rather chary. Here is what one of the newspapers had to say about one particular Bell man:

"He is very fussy about the conditions of this hearing, stipulating that none but the committee be present, and especially no representative of the newspapers be allowed to take any notes of what transpires. He will not engage in any controversy with representatives of other companies, or submit to be questioned by anybody outside of the committee—and," adds the paper, "perhaps he wouldn't tolerate them if he could help it."

In order to hear the Bell side of the question, the committee submitted to these regulations, but insisted that any definite proposition submitted by the Bell man is to be made public.

At a recent hearing before a committee of the town council of Rockport, Me., the chairman was not particularly civil to Mr. Goudy. He was evidently very much in favor of the Bell Telephone Company and made no effort to conceal his disapproval of Mr. Goudy and his company. During the hearing he said to Mr. Goudy:

"I understand that you made some remarks a few days ago during a hearing before the Camden town council, to the effect that many prominent men in this part of New England, are favored with Bell franks. I also understand that you stated that a very prominent gentleman of this town was the possessor of such a frank."

"Yes, sir, I did," answered Mr. Goudy.

"Have you facts in your possession by which you can verify the truthfulness of that assertion?"

"I have," said Mr. Goudy. Opening his grip he produced a list of names of prominent New Englanders thus favored by the Bell company, and among the names was that of the very chairman of the committee. The chairman at the conclusion of the hearing announced that the people of Rockport were thoroughly aroused, and that it was the purpose of the committee to treat all who appeared before them with the utmost frankness, and whichever company was able to save the people money, would be given the opportunity.

WEATHER FORECASTS BY TELEPHONE.

UTILIZING telephone lines as a means of distributing weather forecasts, as outlined by Dr. George M. Chappel, the weather and crop observer for the State of Iowa, was taken up in these columns in a previous issue. At that time the plan had only been perfected so far as writing to the different telephone companies in the State and asking them to co-operate with the Department of Agriculture in the distribution of the weather forecasts. The forecasts were to be telegraphed to the telephone companies each morning, the companies were to telephone the reports to any subscribers to whom the information would be of value. The operator at the telephone company's office would give a distinctive ring on a line, the meaning of which was known by all the people who wished to hear the forecast. On hearing the signal the subscribers would go to their telephones and the operator would repeat the forecast to all of them at the same time.

A majority of the companies written to by Dr. Chappel have responded and all replies received were favorable except three. Of these three, one manager wanted pay for the service and the other two were from owners of private lines, over which the transmission of the reports would be impracticable. A great many letters have been received lately by the Department of Agriculture from patrons of rural telephone lines, all of whom are anxious to see the forecast service established.

Telegrams to the number of 135 are sent out each day to telephone companies in Iowa from the State forecast office in Des Moines. It is expected that this number will be made much smaller after the telephonic system of distribution of the forecasts is in working order. The plan is to have each telephone company to telephone the forecast on to the next one and so on through a long chain. It is predicted that when the system is perfected Iowa will be better supplied with weather forecasts than any State in the Union.

ANOTHER ATTACK BY THE BELL.

THE Pittsburgh & Allegheny Telephone Company, with its principal offices in Pittsburgh, like many other Independent telephone companies, has a rate clause in its Pittsburgh ordinance specifying rates of $48 a year for business houses and $36 a year for residence telephones. The ordinance, however, does not limit the number of telephones that may be placed upon a line, and upon this there will probably hinge a fight with the city, or certain of the city councilmen who may be inspired by the Bell Telephone Company.

The city of Pittsburgh has a population of 350,000 inhabitants, but within a radius of fifteen miles there are some 800,000 people, and the territory in which they live includes a large number of boroughs and the cities of Allegheny and McKeesport. The business world of Pittsburgh is therefore made up of all these municipalities and boroughs and their business and social interests are as closely bound together as if they were one corporation.

Realizing this condition of affairs, about eighteen months ago Sidney H. Browne, vice-president and general manager of the Pittsburgh & Allegheny Telephone Company, adopted a schedule of rates which gave a service without toll charge over the circuit, including all these points within the fifteen-mile circle, such rates being fairly close to the charges of the Bell Company. The latter company has just realized that if the Independent Company continues its successful development along these new lines it will, indeed, be a most dangerous competitor.

Accordingly, adopting its time-worn methods, the Bell Company has begun a policy of obstruction through political channels. A director of the Bell Company in Pittsburgh controls also a large glass industry in the vicinity of Pittsburgh. One of the employes of that company is a member of select council. This councilman had a committee appointed by city councils, of which committee he himself is chairman, for the purpose of investigating complaints that the P. & A. Company is violating its ordinance by charging a higher rate for its service than the rates prescribed in its Pittsburgh franchise.

This committee has met twice and has received complete and frank statements from the officials of the P. & A. Company, but, as was to be expected, the chairman of the committee has not been allowed to drop the matter. He has at considerable expense sent out a circular letter addressed to every subscriber of the P. & A. Company asking them if they were paying more money than $48 and $36 a year for business and residence telephones respectively and in general what complaints they had to make against the company. Such underhand methods by one who is not at all interested and who is not and never has been a subscriber to the P. & A. service may serve the purpose for which they are intended, viz., to create the impression among the subscribers of the P. & A. Company and the public in general that sharp practices were being indulged in.

In commenting on the action of the councilmanic committee, one of the Pittsburgh papers made the following remarks:

"At the low rates the Pittsburgh & Allegheny Telephone Company is giving much the quickest service. Now that this enterprising company has arrived at a stage in its career when it is only a question of time when it will take the lead in the number of subscribers in Greater Pittsburgh, it is met by an attack in city council, and the only result that can possibly come from the issue of the circular referred to is the disturbing of the subscriber or awakening in him suspicions of a company that is acting wholly within its legal rights. The business men of Pittsburgh must realize that since the P. & A. Company came into the field it has been giving an exceedingly satisfactory service, a service which is much more agreeable to use than the service of the Bell Company."

The Pittsburgh & Allegheny Telephone Company is amply supplied with funds, having recently increased its capital stock by $3,500,000, all of which has been disposed of, bringing its total capitalization up to $5,000,000, besides its bond issue of $1,500,000. The company's plans contemplate extensions at an estimated cost of $800,000, about one-third of which will be for long-distance lines. The action of councils referred to has in no way deterred the growth of the P. & A. Company or marred its pleasant relations with its subscribers, who believe, with the public in general, that the adoption by the Bell Company of the methods described must eventually redound as a boomerang to the discomfort of the Bell people themselves. But the latter, with the blind belief in their own invincibility, inherent in the Bell companies, cannot see or will not take the trouble to find out the public feeling in such matters, which the Independent Company has long ago learned to watch as a doctor would the pulse of his patient.

MR. DEAN RESIGNS.

WILLIAM W. DEAN, who for many years has been engineer with the Kellogg Switchboard & Supply Company, has sent in his resignation. The resignation was accepted, and Mr. Dean is now consulting engineer for the Consolidated Fire Alarm Company, 30 Broad street, New York City.

ANOTHER ONE ON CHICAGO.

A CHICAGO man, while in New York, had occasion to telephone from one point to another. When he came from the booth the sweet young lady attendant told him that the toll would be 20 cents. The man from Chicago was irritated and in a rather disrespectful voice remarked:

"Why, in Chicago you can telephone to H—— and back for ten cents."

The girl coyly answered: "But, sir, that is in the city limits."

The Telephone in the Courts

Conducted by A. H. McMillan

Readers are invited to submit questions on any point of telephone law. They will be answered and explained by Mr. McMillan on this page.

JOINT WRONGDOERS SEPARATELY LIABLE.

THE judgment given the plaintiff in the personal damage suit of the Cumberland Telephone and Telegraph Company vs. Ware's Administratrix has been affirmed by the Supreme Court of Kentucky. It was instituted against the Cumberland Company jointly with the city of Owensboro and Westinghouse, Church, Kerr & Co. to recover for the death of the plaintiff's intestate and husband, Thomas Ware. The city had a contract with the Westinghouse Company to construct an electric light plant therein. Poles had been erected and wires were strung and charged with electricity. The telephone company was stringing a wire along Ann street and to do so would have to carry it over the electric light wires that crossed the street. South of the electric light wires were two telephone poles. The deceased ascended the first pole, carrying up a wire to which there was a rope attached. He threw the wire over the cross arm on the pole and dropped an end of the rope to the ground, whereupon Tom Potts, another employe, took it, climbed the next pole and did likewise. Then Lee, the foreman of the force, took up the rope, threw it over the electric light wires and pulled upon it until the wire attached to it came in contact with the electric light wires. It thus became charged with electricity and as a result Ware was instantly killed.

The plaintiff charged negligence on the part of the telephone company because of the way in which Lee handled the rope. She also alleged that the other defendants were negligent in not having the electric light wire properly insulated. The trial resulted in a verdict for the city and the Westinghouse Company and against the telephone company. In the Supreme Court the telephone company urged that judgment should be reversed because the defendants were not joint wrongdoers. This contention the court overruled, saying that concurrent negligent acts produced Ware's death and an action can be maintained against one or against all of the defendants.

Another contention of the defendant was that defendant's negligence was not the proximate cause of Ware's death. This contention was also overruled by the court, which said: "Except for the act of Rufus Lee in bringing the telephone wire in contact with the electric light wire, Ware would not have been injured by the current of electricity which it carried." The last ground of defense relied upon by the telephone company was that it had not been allowed three challenges to the jury separately from the other defendants. Upon this point the court decided that a plurality of defendants constituted but one party to a suit.

Cumberland Telephone and Telegraph Company, 74 S. W. 89.

WOMEN'S RIGHTS DEFENDED WITH AN AX.

THE Greenwood Telephone Company, of Indiana, has sued for an injunction restraining the Misses Maggie and Lora Heck, owners of the Greenwood Sanitarium, from interfering with the erection of the telephone company's line across some land that the girls claim as theirs. The land on which the company wishes to erect its line was intended for a street, but it has never been opened and the girls claim it is theirs until it is so opened.

The facts that led up to the application for an injunction are amusing. The company had already erected poles upon the disputed territory and one morning sent a lineman to string the wires. Miss Maggie Heck, accompanied by the engineer of the sanitarium, who was armed with a sharp ax, met him and forbade him proceeding. He refused to obey and climbed the pole. "You may cut that pole," quietly said the young lady to her engineer, and the keen edge sank deep into the wood. At the first blow or two the lineman gave a laugh, but at the third or fourth he ceased to see the funny side of the situation, and before the pole was half cut away he scampered to the ground. "Finish the job while you're at it," was the command of Miss Heck, and the chips again began to fly. In the meantime the lineman had climbed another pole, and by the time the first came down with a crash the lineman had succeeded in stringing the wire to the next pole. He was chased away from that one and ran on to one of the others. He managed to keep ahead a few poles, and once when he did get some wire in place Miss Heck promptly cut it with a pair of large shears. Finally the lineman fastened his wire to the last pole, all the others having been cut. This one Miss Heck told the axman to spare. A few days later the telephone company came to the girls with a claim for damages, which they declined to pay. The suit for injunction followed.

INDEPENDENT TELEPHONE COMPANY FIGHTING FOR A FRANCHISE IN GREATER NEW YORK.

THE Independent Telephone Company proposes to furnish Brooklyn, N. Y., with a first-class telephone service at rates greatly below those of the Bell Company if it can secure from Commissioner Monroe, of the Department of Water Supply, Gas and Electricity a permit to use the streets. The company was organized and incorporated in 1899 with a capital of $100,000 and the privilege of increasing it to $20,000,000. It proposes to maintain 100,000 telephones in Manhattan, to run a line over Long Island to Montauk Point and north to Rouse's Point, besides putting lines in the various boroughs comprising Greater New York. It proposes also to pay the city $1 for each telephone installed.

The necessary franchise the officers of the company say they have, having obtained under Article 5 of the New York State transportation laws. When, however, they applied to Commissioner Monroe for the necessary permit he refused it on the ground that the new city charter had repealed the law and vested the granting of franchises in the Board of Aldermen. This is denied by the company, which maintains that its franchise gives it the power to put in its poles and wires, subject only to a permit from Commissioner Monroe. To bring the matter before the courts, the company has obtained from Supreme Court Justice Clark a write directing the Commissioner to show cause why a peremptory mandamus should not issue compelling him to grant the company the necessary permit.

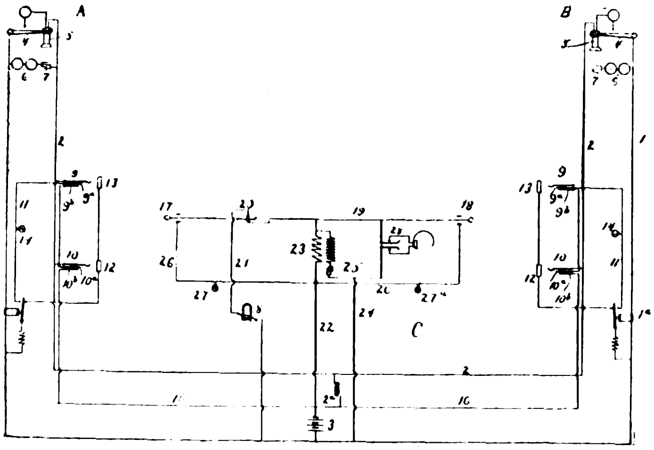
MICHIGAN TELEPHONE COMPANY BEFORE U. S. COURT OF APPEALS.

THE receivership suit against the Michigan Telephone Company has been appealed to the United States Circuit Court of Appeals, sitting at Cincinnati. The Central Trust Company, of New York, which holds mortgages for $1,500,000 upon the Michigan Company's property and sought to be made a defendant in order to protect its interests, is the appellant.

PATENTS ISSUED

CIRCUIT.

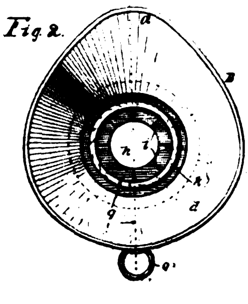
Charles B. Smith, of New York, N. Y., patents (No. 729,801) a telephone exchange system. The operation of the invention, which is shown in the figure, is as follows: The removal of the receiver from the hook at station *B* closes the circuit through coil *2a*, battery 3, and relay *1a*, the circuit of the calling instrument being established through the jack springs, as shown, the armature of the relay, the battery 3 and line 16. The insertion of a plug in the jack breaks the signalling circuit and establishes circuit with line 2, repeating coil 23, which shunts the coil *2a*, and the operation of the listening key 28 enables the operator to learn the connection desired. At the same time the signal *27a* is cut into the circuit through the sleeve of the jack. The busy test circuit is established from the tip of plug 17, sleeve 13, through the sleeve of plug 18, line 26, lamp 27, line 22, battery 3, line 24, through the operator's receiver. When the subscriber hangs up, current flows from battery 3, lamp 27, sleeve of plug in jack, armature of relay *1a*, and back to battery 3, lighting lamp 27 and giving the disconnect signal. When two stations are in talking relation they are connected in metallic circuit through the cord circuit, the battery being bridged across the cord, through line 22 and repeating coil 23, which shunts the coil *2a*. Conversation will be repeated through the medium of the coil in the usual way. The coil *2a* is a high resistance choke coil, and is used to prevent cross talk.



VOCAL GUARD.

William J. Dunihue, of Jamestown, N. Y., patents (No. 730,101) a vocal guard for telephones, and assigns to Wallace B. Curtis and Jay C. D. Curtiss. The invention, a section of which is shown in Fig. 4, consists of a bell-shaped mouthpiece adapted to be fastened to the transmitter casing, the object of the device being to muffle the voice and prevent conversations from being overheard by persons in the vicinity. The muffler, which is made of light material, such as stiff paper, is large enough to cover the greater portion of the face and has at its small end a cylindrical extension by which it is fastened to the transmitter, a lining of cloth or felt being placed between the transmitter and this extension.

Fig. 2.



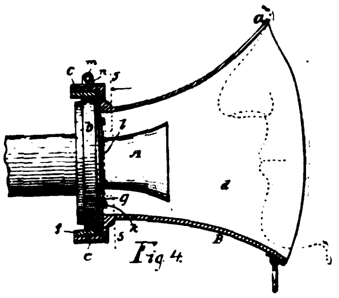


Fig. 4.

A rubber diaphragm, *g*, is placed across the annular surface at the bottom of the cylinder, it being split to allow it to pass over the mouthpiece. This diaphragm is used in order to further destroy the vibration. A reinforcing ring of india rubber is placed on the inner surface of this diaphragm in order to stiffen it. Fig. 2 shows a view looking into the guard.

MULTIPLE JACK.

Lars Magnus Ericsson, of Stockholm, Sweden, patents (No. 729,560) a signalling jack for multiple telephone exchanges. Fig. 1 shows a section of the jack immediately after a call, and Fig. 2 is a similar section after the insertion of the answering plug.

Fig. 1.

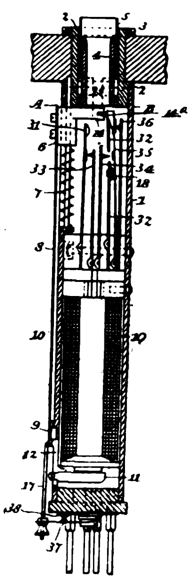
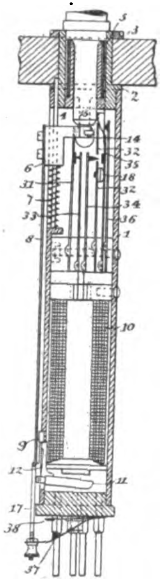


Fig. 2.



The frame of the jack consists of an iron tube 1. Between the socket and neck is located a tubular piece, 5, provided with prongs, 15, 16, which pass through recesses in the shoulder of the guide socket, 4. In the rear of this part the spring jack is placed.

TRANSMITTER ARM.

William Kaisling, of Chicago, Ill., patents (No. 729,184), a transmitter arm, and assigns his invention to the Kellogg Switchboard & Supply Company. The invention relates to a method of obtaining vertical adjustment of the transmitter in places where there is limited space available for the transmitter arm. Fig. 1 is a front elevation of a hotel set equipped with the device, and

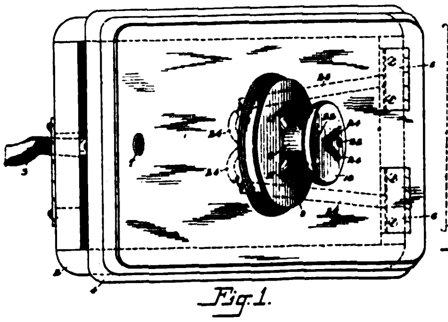


Fig. 1.

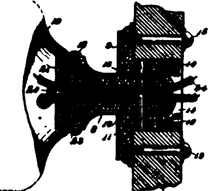


Fig. 5.

Fig. 5 a section through the center line of the arm. The transmitter arm 8 is extremely short and is pivoted upon the base plate 9. The arm 8 is recessed to receive the metallic spring washers 13, in order that the arm may remain in any position in which it is placed.

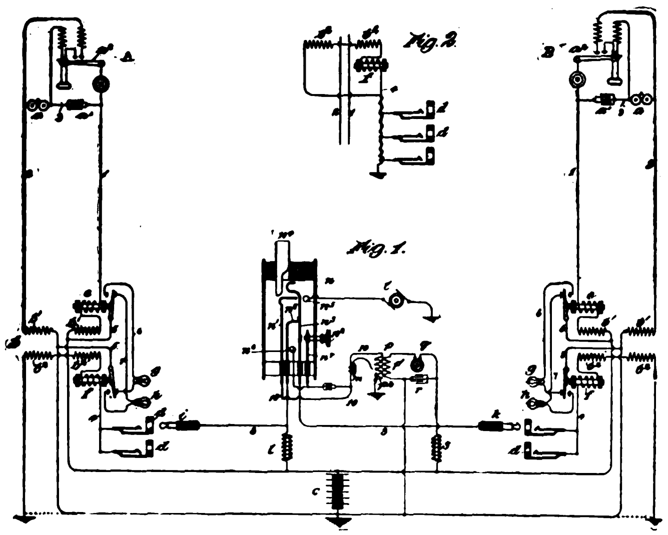
The opening in the base plate 9 has a wide mouth, as shown at 17, and the arm 8 is made hollow so as to contain the wires to the transmitter.

TELEPHONE SYSTEM.

Joseph J. O'Connell, of Chicago, Ill., patents (No. 730,291) a telephone exchange system and assigns his patent to the Western Electric Company. The invention, which is shown in Fig. 1, relates to a simplified common battery system.

The wiring at the sub-stations is of the usual type, as shown at *A* and *B*. At the central office a repeating coil is provided for each line and also two lamp signals, one of which, *g*, acts as a line signal, the other, *h*, acting as a disconnect signal. The two relays, *e* and *f*, control the signals.

The operation of the system is as follows: The removal of the receiver from the hook at station *A* allows current to flow from battery *C* through one winding of repeating coil b^1, through the relay *e* over the line 1, through the instrument back over line 2, through winding b^1 to battery C, thus operating relay *e* and lighting signal *g*. The operator answers by inserting the answering plug *i* into jack *d* and depressing the plunger n^4 of the combined ringing and listening key a part of the way, thus connecting her telephone with the answering plug through springs n^6, n^2. Current at the same time flows through retardation coil *l*, answering plug, jack and relay *f*, through winding b^2 to ground, operating relay *f* and extinguishing lamp *g*. The operator tests the required line by placing the tip of the calling plug *k* in contact with the sleeve of the required jack, and if the line is busy, current flows from the sleeve through the plug, spring n^3, spring n^1 and operator's head telephone to ground, thus giving the busy test. If the required line is not busy, the plug *k* is inserted into the jack and the plunger n^4 pushed clear down, thus applying current from generator *t* to the line and signalling the required station.



The subscribers converse through the repeating coils in the usual way. When the receivers are placed upon the hook the relay *f* is operated and signal *h* lighted, thus giving the operator the disconnect signal. The disconnect signal can be flashed by the subscriber during a connection by working the hook and the operator's attention thus attracted.

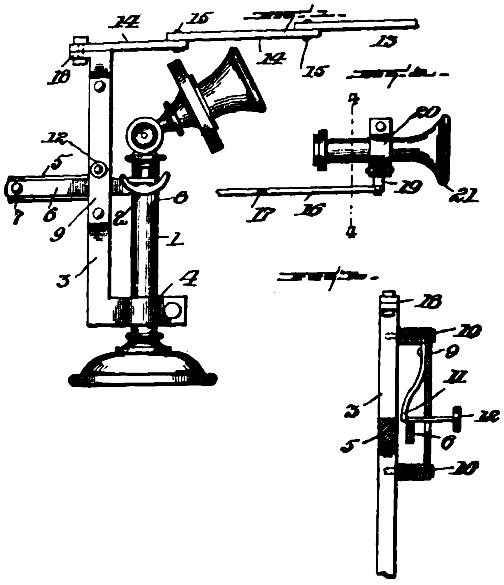
It is proposed to use the calling signal *g* at the answering position and to multiple the disconnect signal *h* throughout the board. the calling signal giving a white light and the disconnect a red light.

The operator is enabled to supervene a connection at any time by pressing the button n^8. The operation of the listening key cuts off the supply of battery from the calling plug *k*.

RECEIVER HOLDER.

Arthur J. Briggs, of Allegheny, Pa., patents (No. 729,267), a telephone receiver holder. Fig. 1 shows a side elevation of the device, Fig. 2 a partial view of the bracket arm and receiver clip and Fig. 3 a partial view of the vertical arm, showing the spring catch.

The arm 3 is provided at its lower end with a clip 4, by means of which it is fastened to the telephone stand. The arm 5 is attached to arm 3 and has the arm 6 pivoted to it. Arm 6 is provided at its forward end with the cut-out portion 8, which receives the receiver rest 2. Bracket arms 13, 14 and 16 are pivoted as shown, the receiver being attached to outer arm, thus rendering it capable of considerable movement. A removable U-shaped casing, 9, is secured to arm 3. The arm 6 extends through this casing and is held in its normal position by the catch 11, which is provided with the operating button 12. In operation the button 12 is pulled outward, allowing the arm 6 to rise and close the usual hook switch circuits.



LAMP SIGNAL.

William E. McCormick, of Chicago, Ill., patents (No. 730,287) a telephone switchboard and assigns his patent to the International Telephone Manufacturing Company. The invention relates to an improvement in line signals in which the signals and guards are made in separate parts and can be readily separated. Fig. 1 shows a partial top view of a strip of signals. Fig. 3 is a side view of the lamp guard and Fig. 4 a side view of one of the lamps employed. The terminals for the lamps are arranged as shown in Fig. 1. The guard, *G*, is made of any insulating material, adapted to removably fit in the sockets of the strip and is provided, at its front end, with a removable cap containing a lens, *g*.

Fig. 1.

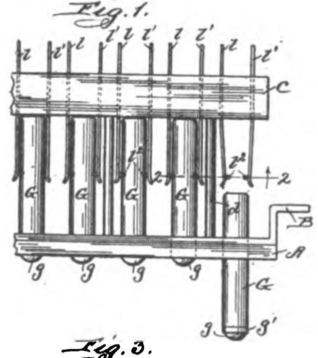


Fig. 3.

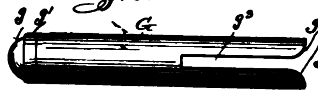


Fig. 4.

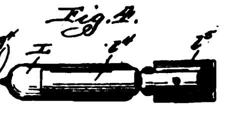


Fig. 5.

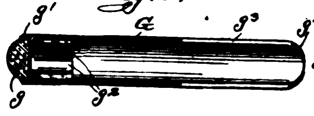
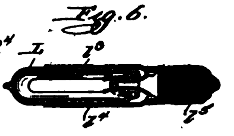


Fig. 6.



The Week's Messages.

FINANCIAL

SHENANDOAH, IA.—At the first annual meeting of the Independent Mutual Telephone Company a 5 per cent. dividend was declared on the preferred stock and a 7½ per cent. dividend on the common stock. The secretary made a general statement concerning the cost of the plant to date and of the income from rentals, which is now running about $850 a month. The stockholders re-elected the board of directors and they in turn re-elected their officers. The present board of directors is composed of Jas. A. Swallow, Fred Fischer, W. F. Broecksmit, C. H. Brown and U. G. Reininger.

TOPEKA, KAN.—The Topeka and El Reno Telephone Company, with W. P. Evans, of Topeka, as president, has increased its capital stock from $100,000 to $200,000.

MONROE, NEB.—At a meeting of the stockholders of the Monroe Independent Telephone Company the capital stock was increased to $10,000.

ROCHESTER, N. Y.—The directors of the Stromberg-Carlson Telephone Manufacturing Company have declared a dividend of 2½ per cent. on common stock and 1¾ per cent. on preferred stock, payable July 1. The books will close June 22 and reopen July 1.

NEWARK, OHIO.—Within the past few months the Newark Independent Telephone Company has increased the number of its subscribers from 650 to over 1,100 and the demand for telephones continues. In order to extend its plant the Newark company has increased its capital stock from $60,000 to $100,000.

COLUMBIA, S. C.—The following assessments have been made by the Board of Assessors: American Telephone and Telegraph Company, raised $48,894; South Carolina Long-Distance Telephone, raised $20,000; Gordon Telephone Company, raised $52,500; Carolina Telephone Exchange Company, no change; Chesterfield Telephone Company, raised $850; Blacksburg Telephone Company, raised $1,400; Glenn Springs, no change; Laurens Telephone Company, raised $750; Ninety-Six Telephone Company, raised $200; Greenwood Telephone Company, raised $1,800; Orangeburg and St. Mathew's, no change; Manning Telephone Company, no change; People's Telephone Company, no change; Island Telephone Company, raised $10,000; Liberty and Central Telephone Company, no change. No action has been taken yet on Southern Bell and Camden Telephone companies or Postal Telegraph Company.

FRANCHISES

DES MOINES, IA.—It is probable that the ordinance repealing the franchise of the Mutual Telephone Company will be passed by the city council. This is on condition that the company will pay $2,000 into the city treasury in settlement of the claim of the city for royalty.

ALEXANDRIA, KY.—Sealed bids will be received by the Campbell County Fiscal Court for a franchise for constructing a subway and planting poles in and under the highways and public roads of Campbell County for a term of twenty years, for the purpose of stringing telephone, telegraph and signal wires in said subway and on said poles, subject to all the conditions and provisions of an order made and adopted June 1, 1903. All bids to be deposited with W. J. Hissem, County Judge, on or before July 6, 1903, at 10 a. m. Said bids to be opened and read at Alexandria, Ky., on such date. The court reserves the right to reject any or all bids.—T. K. Hutchinson, Committee.

COLUMBUS GROVE, O.—The Farmers' Mutual Telephone Company is seeking a franchise from the village council. It is expected that some definite action in the matter will soon be taken.

MADISONVILLE, O.—At a recent meeting of the council the Citizens' Telephone Company asked for the right to string wires in certain streets in the village.

OXFORD, O.—At a meeting of the Board of County Commissioners, the Oxford Telephone Company was granted a franchise to erect and maintain poles and wires for telephone and telegraph purposes along certain turnpikes in this county designated in the application, upon the conditions that the poles shall be erected under the supervision of the County Engineer and located along the sides of the roads.

BEAUMONT, TEXAS.—Manager Palmer, of the Citizens' Telephone Company, of Houston, which controls the Beaumont Company here, appeared before the Chamber of Commerce officers with a view of enlisting its offices in the effort to secure a right of way for a telephone line to Sour Lake. Manager Palmer announces that if the necessary franchises can be secured from the County Commissioners of Hardin and Jefferson counties that the extension of the telephone line to Sour Lake would be at once inaugurated and a complete system installed there.

COMBINATIONS

MUSCATINE, IA.—The lines of the Mississippi Valley and Johnson County Telephone Companies in this city and vicinity have been consolidated. The lines of both companies are to be overhauled and it is probable that an underground system will be installed.

WESTMINSTER, VT.—G. M. Richmond has bought F. L. Temple's telephone line.

ELECTIONS

ALEXIS, ILL.—At the meeting of the Alexis Telephone Company, M. Burns was elected president, W. A. McKnight vice-president and W. G. Stevenson secretary and treasurer. Charles Seevers was appointed manager of the exchange for the next year.

GOFFS, KAN.—At a meeting of the Telephone Company the following officers were elected: L. D. Allen, president; H. F. Hindes, vice-president; C. S. Goodrich, secretary; Chas. Kenison, treasurer. Board of trustees—F. J. Watkins, J. T. Buening, A. J. Derr, Joe McDonnal and Chas. Kenison.

KINGSTON, N. Y.—Mortimer C. Drake has been elected vice-president of the Citizens' Standard Telephone Company, to fill the vacancy caused by the death of Charles A. Shultz.

FOREST CITY, PA.—The new directors of the Northeastern Pennsylvania Telephone Company are: W. E. Perhom, E. H. Ledyard, F. J. Osgood, F. E. Benson and D. R. Braman.

FREDERICKSBURG, VA.—At a meeting of the stockholders of the Upper Rappahannock Telephone and Telegraph Company, held here, the following officers were elected: President, Robert Beverley, of Essex; vice-presidents, Dr. J. Smith, Fredericksburg; Gus Turner, Caroline; H. L. Baylor, Essex; directors, J. W. Parker, L. Sale, J. H. C. Beverley, of Essex; C. L. Mothershead, H. B. Turner, Dr. Charles Gravatt, of Caroline; W. D. Carter, R. L. Biscoe, H. F. Crismond, Fredericksburg.

FREDERICKSBURG, VA.—The stockholders of the Northern Neck Telephone Company have elected the following officers: Congressman William A. Jones, president; Hon. R. Carter Wellford, secretary and treasurer; directors, Judge J. C. Ewell, Lloyd T. Smith, John A. Palmer, W. A. Jones and George N. Reed.

PERSONAL

OAKLAND, CAL.—Mr. F. J. Pazak has recently taken a contract for the installation of a plant for the Oakland Home Telephone Company and at the present time is sending out specifications for a 6,000-line switchboard and instruments.

THE WEEK'S MESSAGES—Continued.

PORTLAND, IND.—George Kinzle has accepted a position as superintendent of the Home Telephone Company, of Portland, and will begin his duties there within a few days.

NEW LONDON, IA.—At a meeting of the directors of the Henry County Telephone Company James Portlock was elected president of the company, to fill the vacancy caused by the recent death of Mr. P. Hillyard.

FULTON, MO.—The Buffum Telephone Company has appointed J. D. Sitton manager of the local exchange.

GLASGOW, MO.—Mrs. R. A. Moore has accepted the position of manager at the Glasgow central telephone office.

ROME, N. Y.—The directors of the Rome Home Telephone Company have appointed Superintendent Delos Odell secretary in place of Alderman D. M. Hall, resigned.

HANOVER, PA.—Cameron L. Bair, who has been manager of the Hanover station of the United Telephone and Telegraph Company, has gone to Harrisburg, to become manager of the station there. Frederick Raymond, of Tower City, is his successor.

UNDERGROUND

OIL CITY, PA.—It is expected that either the city or the Bell Telephone Company will construct a conduit system for telephone wires.

MISCELLANEOUS

FLATROCK, IND.—The workshop of the Flatrock Exchange, owned by Charles Williams, was destroyed by fire.

TERRE HAUTE, IND.—The Citizens' Telephone Company has just celebrated its second anniversary.

DETROIT, MICH.—Other subscribers of the old Detroit Telephone Company finding that John Mahan has finally been given service with all the subscribers of the Michigan Telephone Company through the successful outcome of his suit, will endeavor to secure like service for themselves. Proceedings by them will be begun at once. The Telephone Subscribers' Protective Association, composed of former patrons of the old Detroit Telephone Company, will also have a try in the courts.

DETROIT, MICH.—The Co-operative Telephone Company opened its long-distance lines to Plymouth, where they connect with those of the Independent companies. One hundred and twenty-five subscribers have thus far been secured in this city.

CARROLLTON, MO.—The Missouri Valley Telephone Company, of Carrollton, which opened up less than a year ago, has reduced the Bell Company's list from about 300 telephones down to 15. The Independent Company now has over 400 subscribers.

ST. PAUL, MINN.—Senator F. H. Peterson's measure authorizing municipal ownership of telephone exchanges has failed to get a favorable report in the Senate committee of the whole and was re-referred to the committee on corporations. The bill enables any city to purchase or construct a telephone exchange and requires telephone companies running into the municipalities to connect with the city exchange on such terms as may be agreed on.

HANNIBAL, MO.—The Bluff City Telephone Company, of Hannibal, has commenced business with over 600 subscribers. It is undoubtedly one of the finest plants in the State, its switchboard being Stromberg-Carlson central energy, with a capacity of 1,800 lines.

FORT WILLIAM, ONT., CANADA.—The municipal building, containing the newly installed municipal telephone system, has been completely destroyed by fire.

MINK COVE, N. S., CANADA.—It is reported that S. Gidney, of this place, has purchased the Westport and Digby Telephone Line and will practically rebuild it. The Dominion Government will be asked to lay new cables between Petite and Grand Passages.

BRIDGETON, N. J.—Councilman Valdemar Edwards and Isaiah Barnes have succeeded in getting the right of way from the different property holders for the erection of telephone and distributing poles for the Interstate Telephone Company.

TRENTON, N. J.—The Interstate Telephone Company has completed its line from Mount Holly to Burlington, and subscribers will be entitled to three free calls per day of five minutes each.

CANANDAIGUA, N. Y.—According to the report at the annual meeting of the People's Telephone Company, the organization is prosperous, owning 68 miles of poles in the county and contemplating the extension of its lines along Canandaigua Lake and into Hopewell and Gorham. It was decided to increase the capitalization to $25,000. A 7 per cent. annual dividend has been declared and the following officers elected: President, H. W. Blake, Naples; vice-president and superintendent of construction, John Litzendorf, Honeoye; secretary, George B. Hemenway, Naples; treasurer, George R. Granby, Naples; tax adjuster, Sanford W. Abbey, Allen's Hill; directors, D. O. Pierpont, Allen's Hill; Frank A. Jones, Holcomb; E. C. Church, Canandaigua; auditor, E. C. Church.

ITHACA, N. Y.—The Ithaca Telephone Company will issue a new directory of its subscribers. There will be 185 new names on the list, which brings the total names to 760. A new feature is a special directory of business houses.

LE ROY, N. Y.—The Inter-Ocean Telephone and Telegraph Company, to be known hereafter as the Le Roy Telephone Company, now has its exchange installed and communication can be had with Stafford, East Bethany, South Byron and Byron Center. One hundred telephones have been contracted for in the village and an elegant exchange has been fitted up.

MARLBOROUGH, N. Y.—An effort is being made to induce the Colonial Company to give free service to this city. The village objects to the charge of 15 cents a call, made by the Hudson River Company, and the new company is being urged to meet the demand.

CLEVELAND, O.—Since the issue of its last list of subscribers on April 1, General Manager Turner, of the Cuyahoga Telephone Company, has been forced to issue a supplementary list of 600 names.

CARLISLE, PA.—The Carlisle Council, having taxed all electric light, telephone and telegraph poles 75 cents apiece, some companies refuse to pay and the matter will be taken into court.

ROCHESTER, WIS.—At a meeting of the directors of the Burlington, Rochester & Kansasville Telephone Company, held at Rochester, it was decided to build a branch line to Vienna.

New Construction in the Field

BIRMINGHAM, ALA.—The People's Telephone Company is installing an exchange at North Birmingham.

TOMBSTONE, ARIZ.—E. T. Ijams, president of the Tombstone Telephone Company, and Manager A. G. Sharkey left with a force of men to begin the work of installing the branch telephone line from Fairbank to Benson. The poles, wires and necessary material are now at Benson and the extension is an assured fact.

FORT SMITH, ARK.—The Indianola Contracting Company has given the contract to M. A. Donald for the construction of a telephone line along the Muskogee Southern Railroad for about 20 miles.

FREDERICTON, N. B., CAN.—The annual meeting of the stockholders of the New Brunswick Telephone Company was held here. The usual dividend of 4 per cent. on the capital stock was declared. It was decided to string a copper metallic line from Fredericton to St. John and from Moncton to St. John. This is necessary, owing to the increase in business. Hon. Mr. Blair was chosen president, J. L. Black, of Sackville, vice-president; Senator Thompson, managing director, and W. E. Smith, secretary and treasurer.

TAMPA, FLA.—The Peninsular Telephone Company is pushing its new line toward Thonotosassa and will have it connected within a short time. Thonotosassa will have a local exchange, as well as the long-distance.

DIXON, ILL.—Work on the Northern Illinois Telephone Company is progressing rapidly at Paw Paw. The switchboard has been installed in its new quarters. The Northern Illinois succeeds the Lee County Telephone Company, and the linemen are rushing to connect the telephones, setting poles and stringing wires. The completion of this line is a step in the establishing of a continuous metallic circuit from Dixon to Paw Paw, Sandwich and east.

STREATOR, ILL.—Manager Shuler, of the Independent Telephone Company, expects to have the toll line to Ransom completed soon, giving connection with more than 100 instruments on the farmers' line. The copper wire has arrived for the direct line to Ottawa, and traffic arrangements have been made with the Home Telephone Company.

DECATUR, IND.—Active work on the construction of the lines of the Hoosier Telephone Company has been begun in this county. The company

THE WEEK'S MESSAGES—Concluded

is composed of Portland people, and when completed the line will extend through seventeen counties.

MODALE, IA.—The Interstate Telephone Company will soon put in an exchange in this city and put its line from Mondamin to Missouri Valley in first-class shape. The line will probably be extended to Little Sioux and up the Soldier Valley in the near future.

VAIL, IA.—The Vail Telephone Company has two gangs of men building lines.

ALBANY, KY.—Albany is soon to have a telephone communication. The Gainesboro Telephone Company will put in an exchange here.

BALTIMORE, MD.—The Maryland Telephone Company has completed its new toll line to Philadelphia.

GILFORD, MICH.—The Valley Telephone Company is putting a line through from Saginaw to Caro and thence to Port Huron, and one from Bay City to Bad Axe. This week they put in a cross line to Gilford, from the south line connecting the two.

UNION, MO.—The Union and Cedar Grove Telephone Company has completed through connection with Kahoka.

ORD, NEB.—The Enterprise telephone line has run its line to Ord.

CAMDEN, N. Y.—The Camden Telephone Company is constructing a line between here and Williamstown.

EDMESTON, N. Y.—The Wharton Valley and New Berlin telephone companies are constructing a metallic circuit between Edmeston and New Berlin, to connect at New Berlin with other long-distance metallic circuits.

ELMIRA, N. Y.—The York State Telephone Company is rapidly extending its lines and increasing its service and facilities.

MASONVILLE, N. Y.—The Masonville Telephone Company has extended its lines and made connection with the Bennettsville central.

MIDDLETOWN, N. Y.—The Orange County Telephone Company will connect with Warwick and also with Newton. Through connection with the Highland Company at Washingtonville will be established. Orange County telephone subscribers will be able to connect with the Colonial Company at Newburgh, which will give large additional connections to the local service.

NORTH GRANVILLE, N. Y.—The Granville Telephone Company's line is being put up on the Whitehall road. It will probably be extended to Whitehall in the near future.

SALAMANCA, N. Y.—A new 50-drop section is being installed at the local exchange.

ALLIANCE, OHIO.—The North Benton Telephone Company has reached the suburbs of Alliance with its lines and will connect with the Stark County Telephone Company.

MANHEIM, PA.—Manheim is to have a telephone exchange, and it is expected to have it in complete working order by the first of July. A. Paul Rohrman, manager of the United Telephone and Telegraph Company, has been in town the past week arranging for the exchange. After the exchange is in good working order it is proposed to extend the lines of the company to the north and northwest of town.

MONONGAHELA, PA.—Henry Bennett, of McKeesport, district manager of the Federal Telephone Company, is arranging for the extension of the Federal service in Monongahela.

SCRANTON, PA.—The Consolidated Telephone Company is surveying for new lines.

TOWANDA, PA.—Independent telephone connections have been established from Binghamton northward to Cortland, Syracuse, Oswego, Rome, Watertown and other points in Northern New York, and the line connecting Elmira and Binghamton is built eastward from Elmira as far as Spencer, and is to be at once pushed to completion. These lines are operated by the York State Telephone Company, as are also the exchanges in Elmira and Binghamton, and it is expected that before fall the lines of the Bradford County Telephone Company will be connected. General Manager Thayer, of the Bradford County system, is now at work in the vicinity of Wyalusing, on the new trunk line from Towanda to Laceyville, and the line will be pushed to completion as rapidly as possible. The poles are all set in Wyalusing borough, ready for the cable and wires.

WARRINGTON, PA.—At a meeting of the Mutual Telephone Company of Warrington it was decided to build a line from Tradesville.

WASHINGTON, PA.—The Federal Telephone Company is making active preparations to commence extending its line in the Tylerdale neighborhood.

KNOXVILLE, TENN.—The People's Telephone Company, of this city, has completed a line to Jellico and will build into the Eastern Kentucky coal fields.

EL PASO, TEXAS.—Work upon the connection of the Alamogordo Telephone Company line with the El Paso lines is being pushed.

OSHKOSH, WIS.—A. B. Ferdinand, of Milwaukee, promoter of the Winnebago Telephone Company, stated that he was here to arrange certain details for the company and that the work of constructing an Independent telephone system in Oshkosh would be commenced very soon.

BESSEMER, ALA.—The People's Home Telephone Company is rapidly extending its lines in this section.

STARKE, FLA.—M. G. Rowe, manager of the Starke Telephone Company, has gone to Lake City, where he will begin at once on the Lake City telephone exchange, having secured a franchise some time ago.

DIXON, ILL.—A number of farmers in Grand Detour are now building lines into Grand Detour, where they will connect with the Lee County Company line. The Lee County Company will build a new line from Dixon to Grand Detour and an exchange will be installed at Grand Detour.

WAYNESVILLE, ILL.—The Farmers' Interstate Telephone Company, of Waynesville, has secured a room and will locate its exchange there.

INDIANAPOLIS, IND.—The New Telephone Company is extending its line from Noblesville to Logansport.

ONAWA, IA.—The Onawa Telephone Company is building a line to Decatur, Neb. The steel towers on each side of the Missouri River, where the line crosses, will be eighty feet in height.

BATH, ME.—The Slate Belt Telephone Company will establish an exchange at Bath and also extend its line from Bath to Chapman Quarries, Cross Roads and Klecknersville.

PORTLAND, ME.—The *Argus* says: "The new building of the Northeastern Telephone Company, on Casco street, is up far enough so that the name of the company doth appear over the main entrance in enduring stone."

READFIELD, ME.—The Crosby Telephone Company has extended its line to Craig's Point and Maranacook.

BROOKFIELD, MO.—The Crescent Telephone Line has been connected with the exchange here. It is owned by A. L. Sportsman, Wm. Sissons, James Carroll, Harry Litchenburger, Marion Stuver, Lawrence Miller and Mrs. R. E. McGregor.

LA GRANGE, MO.—Workmen have begun hauling poles and setting them in La Grange. The lines are to be built for the Farmers' telephone exchange, of this place. The switchboard will be installed soon.

BAINBRIDGE, N. Y.—The stockholders of the Riverside telephone line, which runs from Bainbridge to Sidney on the west side, have voted to extend the line to Otego.

GRANVILLE, N. Y.—The Granville Telephone Company has connections with Albany, Schenectady, Cohoes and Waterford. Its new line, from Rupert to West Hebron, will soon be completed.

GUILFORD, N. Y.—The officers of the three telephone lines connecting Guilford with West Bainbridge and Sidney will meet at R. W. Stead's office to consider better connections with the central office and improving the service.

NORTHWOOD, N. Y.—The Northwood, Remsen & West Canada Creek Telephone Company has been authorized to issue 231 shares of stock at $5 per share for the purpose of running a line from Grant to Gray and thence to Cold Brook, a distance of fourteen miles.

WALTON, N. Y.—The Walton telephone exchange and the Hancock Telephone Company have connected their lines between Apex and Rock Rift. The Hancock Company has been reorganized, with Arthur Pierson as president and general manager.

WINSTON-SALEM, N. C.—S. T. Neal, manager of the Interstate Telephone Company, says that during the fall the entire system will be overhauled and renewed.

CALDWELL, OHIO.—The Mount Ephraim Telephone Company has erected poles and strung wires through Caldwell. A number of farmers' lines now enter here and there are probabilities of a farmers' exchange being established.

DUSHORE, PA.—The Colley telephone line will soon be completed into town.

UNIONTOWN, PA.—P. A. Johns, manager of the Bill Pritts distillery, is connecting the brewery with the Tri-State line and also with the Somerset County line. This will give the Tri-State connections by way of the Somerset County line with Johnstown, Altoona, Cumberland and Indiana.

WEST SUPERIOR, WIS.—The People's Telephone Company, of this city, and the Independent Company, of Ashland, will build lines to meet each other. R. C. Ogilvie and Manager J. C. Crowley, of the People's Company, have just completed arrangements for building a line to Lake Nebagamon. From Nebagamon the Superior Company will build eastward to Iron River and will be met at that place by the Ashland Company.

PERSONAL.

GREENSBURG, PA.—J. B. Johnston, general manager of the Cambria County Telephone and Telegraph Company at Cresson, has resigned and will accept a responsible position with the Pittsburg and Johnstown Long Distance Telephone Company. His headquarters will be at Greensburg, which will be the centre of operations on the new line.

HOUSTON, TEX.—F. G. Smith, manager of the Citizens' Telephone Company, has gone to New York.

TRADE NOTES

W. T. Jackson, of Cincinnati, O., with G. M. Gest, the electrical subway contractor of that city and New York, was in New York last week.

The American Endoscopic Company, of Providence, R. I., makes all kinds of miniature incandescent electric lamps for telephone switchboards, etc. Its switchboard lamps especially are models of perfect workmanship. The company is putting a neat pocket searchlight on the market.

Cambridge, Ohio.—Mr. E. F. Kent, who is well known in telephone circles, having been identified with the cable departments of some of the largest Bell and Independent companies, is just completing the work on the new multiple cable distribution for the addition to the Cambridge Telephone Company's plant. Mr. Kent is in the employ of Le Roy W. Stanton, the telephone engineer of Cleveland, Ohio, who has charge of the work.

Cleveland, Ohio.—Mr. F. A. Focke, engineer for the Federal Telephone Company, has resigned his position with them and has accepted a position with L. W. Stanton, the constructing and consulting telephone engineer of Cleveland, Ohio. Mr. Focke's practical experience and technical training in telephone engineering fit him specially well to assist Mr. Stanton, who is building and equipping telephone systems and making a specialty of multiple cable distribution and construction.

The Automatic Electric Company, Chicago, manufacturers of the Strowger automatic telephone equipment, have recently sold to the Columbus Automatic Telephone Company, Columbus, Ga., complete equipment for a present installation of 700 lines, the switchboard to have an ultimate capacity of 3,000. Among other orders recently received by the company are the following: 100 station switchboard for the Mount Olive Telephone Company, Mount Olive, Ill.; 100 station switchboard for the Home Telephone Company, Birmingham, Ala., to be located in a branch exchange and work in connection with the larger exchange of that company in Birmingham; 100 station witchboard to the Vermillion County Telephone Company, Danville, Ill., to be located in a branch exchange and to be connected with the exchange in the city of Danville; 50 station switchboard to the United States Arsenal, Rock Island, Ill.; 40 station switchboard to the University of North Dakota, Grand Forks; 40 station switchboard to the Cape Railways Company, Cape Town, Africa; 150 station switchboard to A. J. Perkins & Son, Medford, Wisconsin.

The Stromberg-Carlson Telephone Manufacturing Company, of Chicago, Ill., and Rochester, N. Y., have favored us with three bulletins describing their apparatus and supplies. These three bulletins should be in the hands of every telephone man in the country.

Bulletin No. 1 treats of interurban telephones and systems, Bulletin No. 2 tells about bridging telephones, and No. 3 describes the general telephone and construction supplies which the company handles. All of the bulletins are gotten up in the usual Stromberg-Carlson manner, which means "particularly well." They are printed on fine wood-cut paper and are illustrated with half-tones and wood cuts that are all that the most critical could desire.

To a railway company having in operation an interurban telephone-dispatching system, or to one which contemplates installing such a system, Bulletin No. 1 would be of great value. The book starts out by describing the special apparatus which the Stromberg-Carlson Company has designed to meet the requirements of interurban railway service. A complete line of telephone sets enclosed in weather-proof iron boxes, arranged to be fastened to poles along the right of way, are described. Jack boxes, also weather-proof, are manufactured. These are intended to be placed on poles where only an occasional communication with the car dispatcher is desired. Pocket talking sets associated with a plug, which can be inserted in the jack to be carried by the trainmen, are made by the company and are taken up in the bulletin. Switchboards and protective apparatus are described. A large portion of the book is devoted to a description of some of the systems that the Stromberg-Carlson Company have installed, and sample forms and the methods used by dispatchers in the handling of trains are given. The last part of the bulletin is taken up by a model set of "Rules and Regulations Specially Governing Interurban Lines." The different signals and practices used by interurban companies now operating are printed. This feature is enough in itself to make the book a valuable one to the street-railway man.

Bulletin No. 2 describes bridging telephones and the construction and operation of country lines and village exchanges. Details are given as to construction of lines, wiring of telephone apparatus and the location of troubles. In the rear are printed model forms for the various documents that a telephone company starting business would be apt to need, and also a model "Constitution and By-laws" for a telephone company.

Bulletin No. 3 describes and gives prices on a full line of construction material and telephone supplies.

Any or all of these bulletins will be sent free of charge to any one writing to any of the offices of the company.

A contract for a telephone equipment has recently been closed by the Stromberg-Carlson Company with the Southern Pacific Railroad through its general foreman of Telephone and Telegraph, Mr. A. S. Foote. The system is to be used on the division from Elapaso to New Orleans. Mr. Foote is stringing copper circuits between cities. From station to station he uses grounded circuits. This places section, engine and work crews at the disposal of the dispatcher. It is also proposed to place at every blind siding some kind of a telephone or apparatus that will enable wrecking crews to communicate with the dispatcher.

The Kearney Telephone Company, of Kearney, Mo., has bought a 100-drop Stromberg-Carlson switchboard and 200 telephones. Other recent sales made by this company were a magneto switchboard to the Deerfield Telephone Company, of North Benton, Ohio, and a large number of bridging telephones to the Clinton Telephone Company, of Wilmington, Ohio.

PLANTS FOR SALE

Advertisements under this head $1.00 for 25 words or less for each insertion. Prepaid.

THE NORTH STAR TELEPHONE COMPANY, of Mountain Lake, Minn., offers $10,000 of its stock for sale, at par; $100 a share. At present paying 10 per cent. dividends. Address NORTH STAR TELEPHONE CO., Mountain Lake, Minn.

WANTED

Advertisements under this head, 25 cents for 25 words or less for each insertion. Prepaid.

A BELL MANAGER wants position as manager or assistant with first-class Independent company. Will be at liberty July 1st. Address BOX 58, American Telephone Journal, New York.

POSITION as manager or superintendent of exchange, 200 to 300 lines; five years' experience on board, toll lines and construction work, grounded or metallic; aged 38; married, sober, industrious and reliable. Address A. W. Cripps, Harrison, Ark.

COMPETENT telephone man desires position; eight years' experience in construction work, repairing instruments and general trouble work; best of reference as to ability and character. Address John H. Ward, Little Falls, Minn.

DRAFTSMAN familiar with telephone cable distribution, handling men, making out estimates, etc. State experience and salary expected. Address BOX 56, care The American Telephone Journal, New York.

SUCCESSFUL manager will be open for position about August 1st. Familiar with up-to-date system and methods. South or West preferred. Satisfactory references. Address BOX 54, care The American Telephone Journal, New York.

POSITION AS TROUBLEMAN; have had seven years' experience as local and long distance telephone troubleman, and also fire alarm troubleman; Minnesota or Dakota preferred. Address BOX 50, care The American Telephone Journal, New York.

WIRE CHIEF wanted immediately for central-energy plant; none but first-class men need apply. Address Jackson Home Telephone Company, Jackson, Tenn.

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